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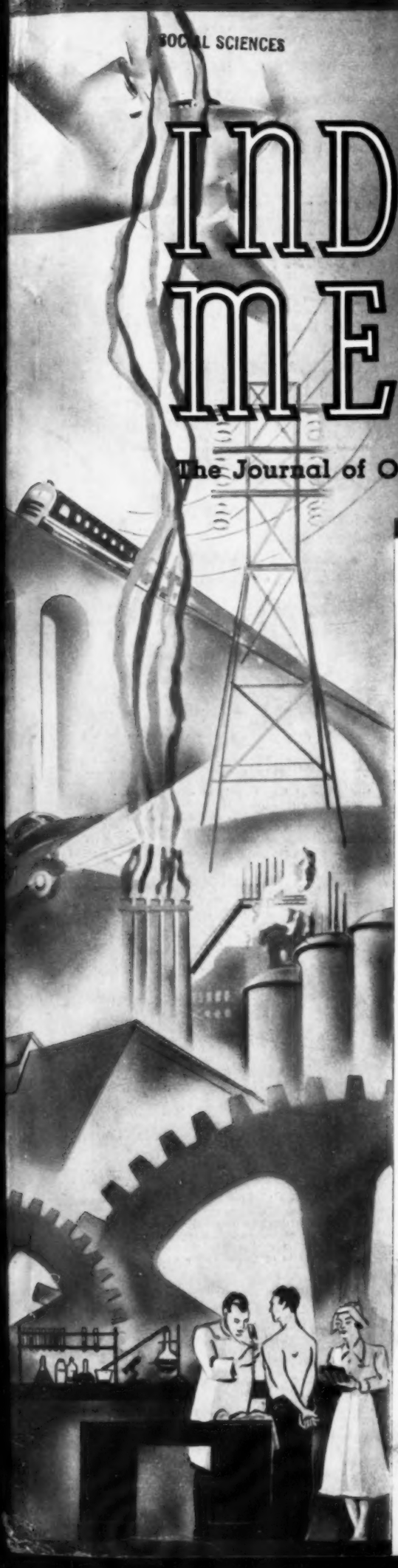

INDUSTRIAL MEDICINE

The Journal of Occupational Diseases and Traumatic Surgery

February, 1942

Chemical Gas Gangrene
— From Metallic Magnesium —

Policies and Procedures
— Of an Industrial Medical Department —

The Commonest Hand Dermatoses
— Eczematoid Ringworm, Eczema, Dermatitis Venenata —

Whither Industrial Medicine?
— Observations on Certain Economic and Social Factors —

Injuries of the Hand
— Nerve and Tendon —

The Worker's Welfare
— What One Plant Is Doing About It —

Factories During Blackout
— Lighting, Ventilation, Safety —

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— In Naval Defense Industry —

Mental Hygiene
— Application to the Problems of the Industrial Nurse —

Cutting Oil Sanitation
— Recommended Procedure —

Industrial Medical Services
— Approved by the American College of Surgeons —

Volume 11 Number 2

CASE F: TROPHIC ULCER OF LEG

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Figure 2: Appearance of same lesion 11 weeks later, following consistent treatment with White's Vitamin A and D Ointment and the use of a zinc-gelatin boot. Dressings were renewed at intervals of one week or longer. Progressive local repair occurred during the intervening 11 weeks to a point of complete re-epithelization as shown.

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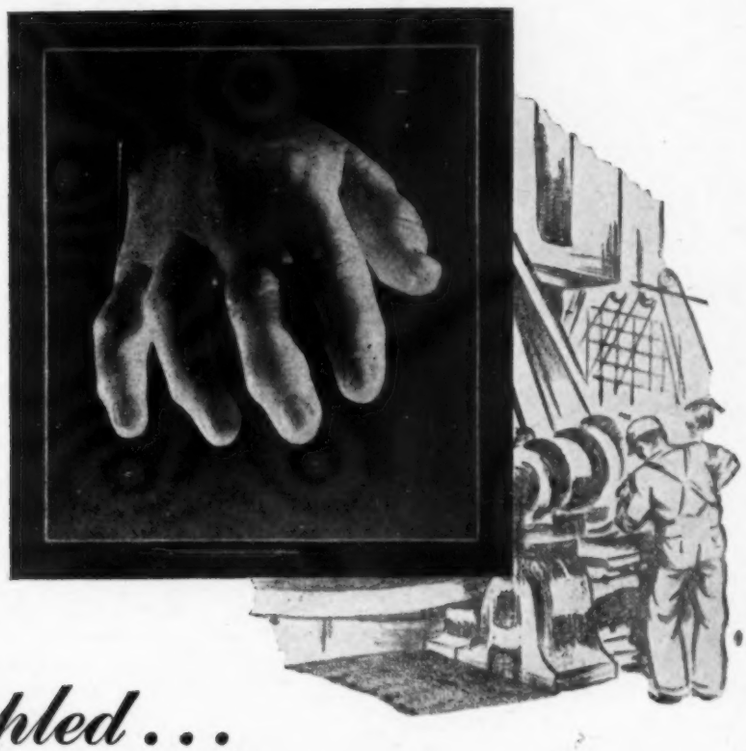

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AS AN illustration of the tremendous range of interests which industrial medicine touches upon, and which touch upon it, this issue is "multum in parvo." From executive delineation of "Policies and Procedures" (p. 47) to ultra-violet purification of the work-place atmosphere (p. 68); from the 959 medical services approved by the A.C.S., which can't talk about them (p. 79) to the one established by the *Chicago Tribune*, which can (p. 69); from tendencies of the mind which need to be adjusted (p. 97) to tendons of the hand which require to be sutured; from old and common dermatitis (p. 55) to new and uncommon metallic gas gangrene (p. 71); from war necessities (p. 76) to after-the-war possibilities (p. 58); from canvas to culture, metals to music, nurse to Navy, oil to ointment, wounds to welfare—the scope of the articles is as wide as the variety of all that men are interested in, and the pages that include them here make interesting reading. . . . THERE isn't an American, young or old, who doesn't feel the urge to be doing something directly related to the war. As the news comes in that this one of our readers is "leaving for foreign service" or that one "is on the high seas," the young-in-body read with eagerness, the young-in-heart with envy. But most of us, as MISS JOHNSON says (p. 93), "belong among the 18," and all we can do, for the present at least, is "a better job where we are." Possibly another way of saying: "Let's make war

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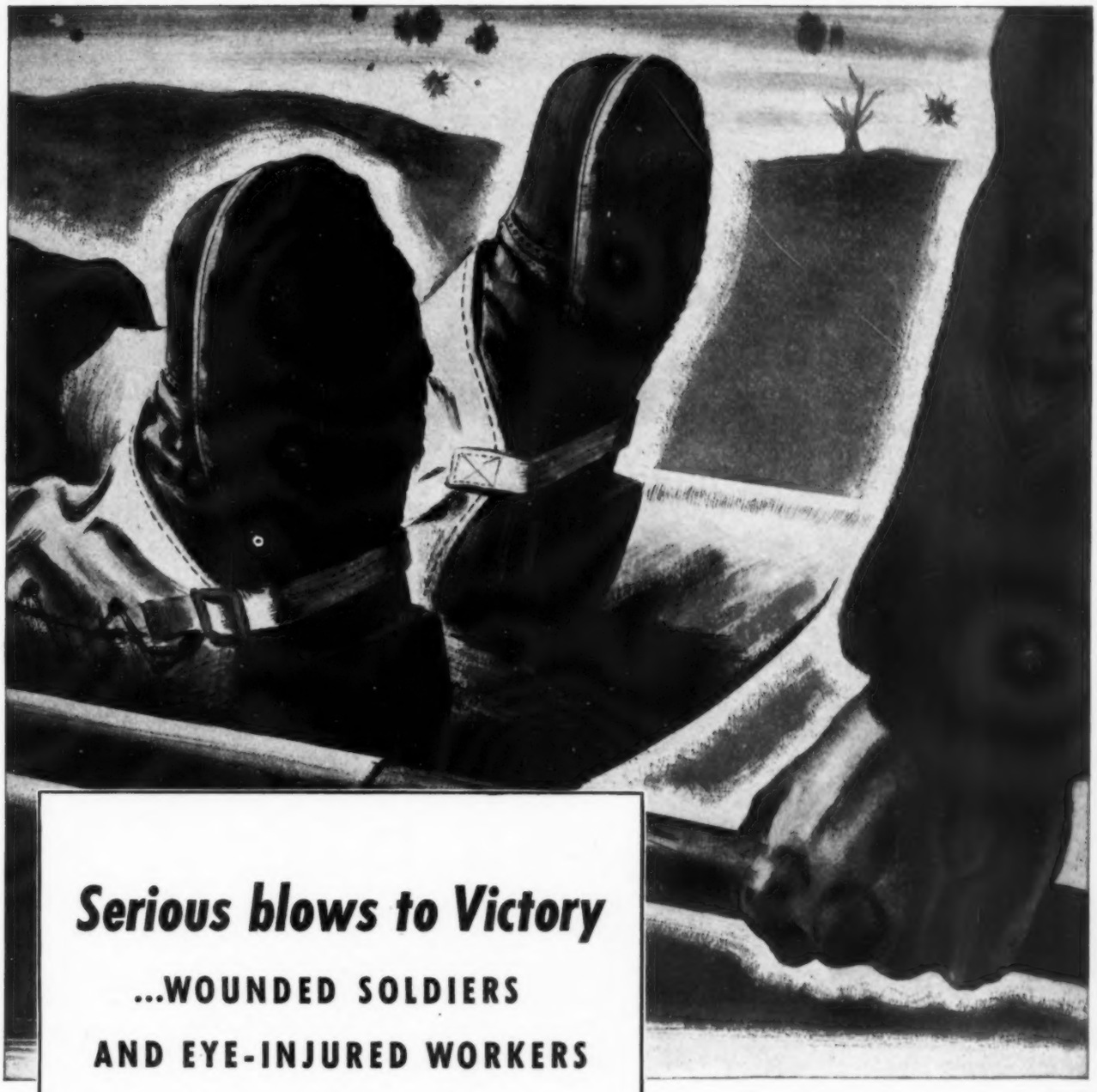

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THIS MONTH

materials here with the same fanaticism which, in Germany, makes Nazis. . . . " The editorial "Keep 'Em Flying" (p. 85) mentions the anticipation of war-born hazards. DR. MCCORD'S "Chemical Gas Gangrene from Metallic Magnesium" (p. 71) is an instance, as startling and dramatic as anything that is likely to happen in industrial medicine. Whether there have been cases in workers is not for discussion. The significance reposes in the fact that from now on, at least, there won't be—either during the war or after, when this "Cinderella" of metals, as he calls it, one-third lighter than aluminum and more plentiful than any other within the reach of man, is bound to have innumerable uses. Important as this is, however, it is only one of the scores, perhaps hundreds, of investigations now being conducted in industrial laboratories under the supervision of industrial physicians and hygienists. DR. MCCORD, himself, is the directing genius of several dozen, at least. With men of such ability at the posts of guidance, our editorial confidence that this teeming present of industrial medicine is in competent hands is fully justified.

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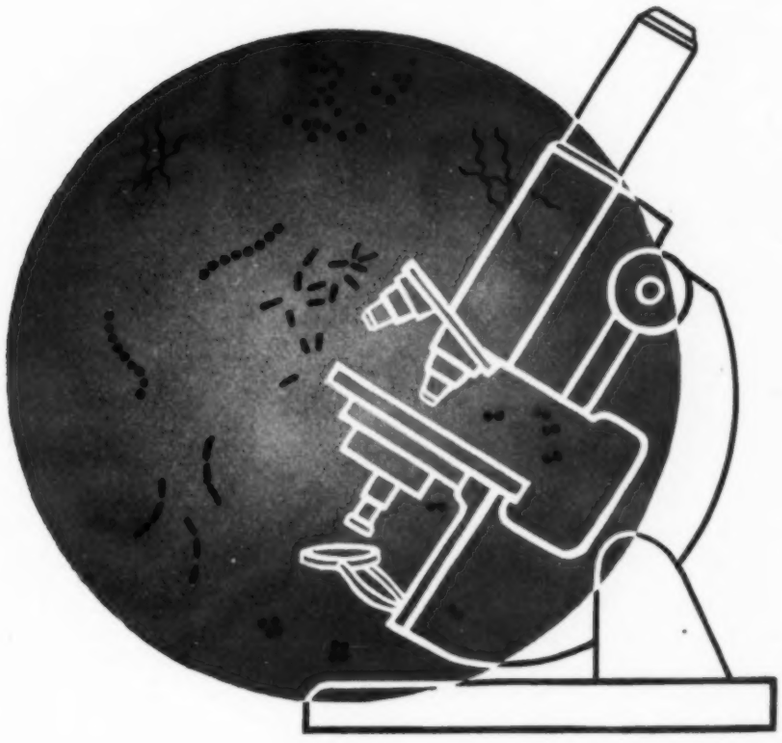

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DRS. R. C. ENGLE, NATHANIEL M. JONES, and RICHARD P. BELL are, respectively, President, Vice-President, and Secretary-Treasurer of the Cleveland (Ohio) Industrial Physicians Club, recently formed to exchange views and study problems in the field of industrial medicine.

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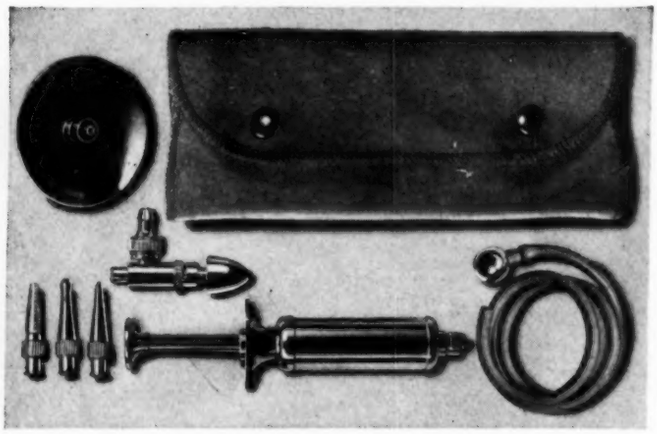

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work will remain at work. Therefore it is of the greatest importance for employers to take greater precautions than usual to prevent industrial accidents. Older employees are usually more careful than younger ones but they react more slowly and so are more often injured. It also takes them longer to recover."

DR. N. GILMORE LONG, Fellow of the NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS, has been called into active military service as a Captain.

W. P. YANT, EDWARD LEVY, R. R. SAYERS, CARLTON E. BROWN, C. E. TRAUBERT, H. W. FREVERT AND K. L. MARSHALL are the authors of Bureau of Mines Investigation, R.I. 3585, November, 1941, entitled "Carbon Monoxide and Particulate Matter in Air of Holland Tunnel and Metropolitan New York," (69 pages with tables and illustrations). They conclude: "The concentration of carbon monoxide and particulate matter in air in the immediate vicinity of the tunnel did not differ significantly from that in the air in other parts of metropolitan New York."

LOUISIANA'S State Department of Health has established an industrial hygiene section in its division of preventive medicine. U. S. Public Health Service will lend personnel and equipment.

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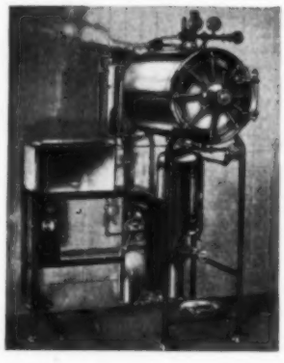

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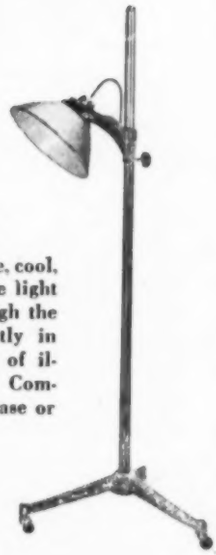

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—From "Washington Goes to War," by MILTON MAYER, in *Life*, January 5, 1942.

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—DR. A. C. IVY, at Fourth Annual Congress on Industrial Health, Chicago, January 12, 1942.

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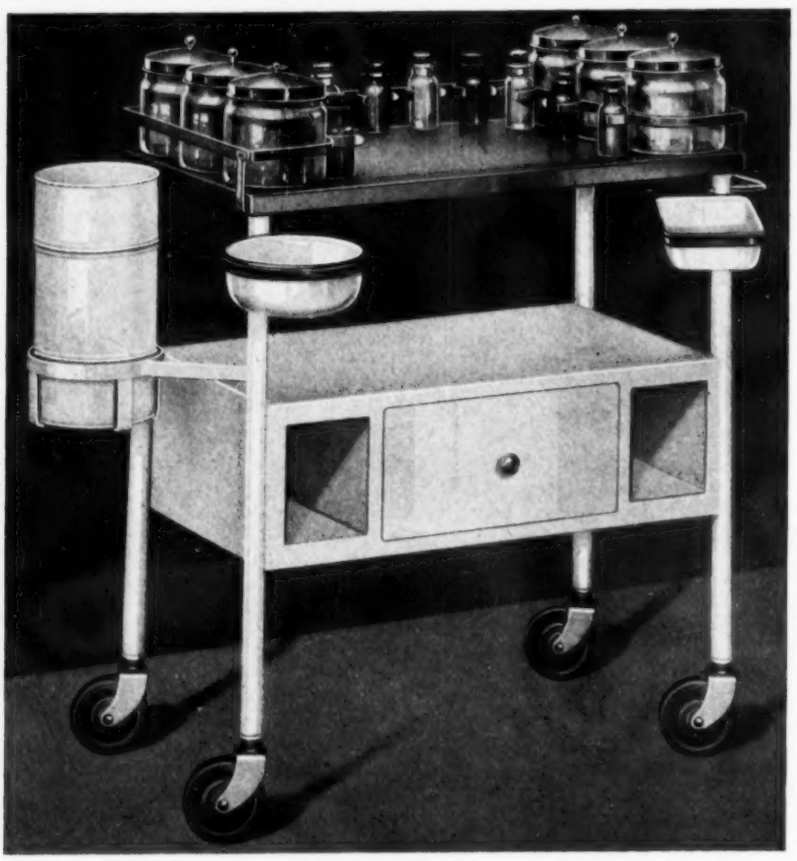

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Pelton STERILIZERS

Occupational Asthma

OCCUPATIONAL asthma, is so called because the attacks occur during the time when the individual is engaged in the particular employment which causes the asthma. These patients are usually free from attacks when they are not at work. Obviously, the ideal treatment is a change of occupation. But this is not always possible. Hence desensitization, as in all allergic cases, should be instituted. The results are fairly successful. Where treatment has been neglected and the patient persists in his occupation for many years, there is usually much tissue damage in the lungs, and the asthma may continue the balance of his life.

—(From "A Treatise on Asthma," by DRS. CHARLES A. SPIVACKE and HERBERT L. FRANKLIN, New York City, in *Medical Record*, December 17, 1941.)

Metropolitan Life Bulletin

IN A LARGE group of industrial workers the proportion of the cases of tuberculosis found in a minimal stage has almost trebled since 1929. Moderately advanced cases have decreased slightly and far advanced cases are about one-third the former proportion. This change is explained largely by the fact that in recent years fluoroscopic examinations of the chest (and roentgenograms when indicated) have been made prior to employment and as part of the annual routine examinations of all employees of the Metropolitan Life Insurance Company.

Industrial Nurses Institute

INDUSTRIAL NURSING SECTION of S. O. P. H. N. of the State of Texas will hold an Industrial Nurses Institute February 14, 1942, in Port Arthur, Texas. Headquarters for the Institute will be in the Goodhue Hotel. DR. M. N. NEWQUIST, of New York, Medical Director for The Texas Company, and MISS OLIVE WHITLOCK, Industrial Nurse of U. S. P. H. S., will appear on the program.

Metal Fume Fever

WORKERS most frequently exposed to the hazards of metal fume fever include those who work with the following metals when they are heated, either alone or in combination:

Aluminum	Cadmium	Magnesium	Selenium
Antimony	Copper	Manganese	Silver
Brass	Lead	Nickel	Tin
Zinc (Smelting and galvanizing)			

This list is not complete. Metal fume fever may occur wherever metals are heated to high temperatures. Most cases arise among brass founders, zinc smelters, welders, and "metallizers." Metal fume fever arises from the breathing of fine particles of burned metal in the fumes given off when these metals or alloys are exposed to great heat. These particles (fumes) are very small and pass into the lungs easily. They cause general disturbance of

REDUCING NICOTINE INTAKE

HOW MUCH COOPERATION CAN YOU COUNT ON WHEN MODIFYING PATIENTS' SMOKING?

USUALLY the physician has two objectives in his program for improving a patient's smoking hygiene: 1. Reduction of the nicotine intake. 2. Assurance of his patient's full cooperation.

Your recommendation of Camel cigarettes is sound on both counts, because Camel is the slower-burning brand. Medical–research authorities* find that the slower-burning cigarette produces less nicotine in the smoke. Camel's scientific tests ** show that Camels burn slower and that the smoke of Camels contains less nicotine than the average of the other brands tested.

Camel's lesser nicotine content in the smoke provides a valuable improvement in hygiene, while Camel's slower burning–the "pleasure factor" for extra mildness, better flavor–assures the cooperation of the patient.

FOR THE PHYSICIAN WHO WISHES TO REVIEW THE MODERN MEDICAL ASPECTS OF SMOKING

–a recent article by a noted physician. Send for a reprint from The Military Surgeon, July, 1941. Camel Cigarettes, Medical Relations Division, 1 Pershing Square, New York City.

**J. A. M. A., 93:1110, Oct. 12, 1929*
Bruckner, Die Biochemie des Tabaks, 1936
***The Military Surgeon, Vol. 89, No. 1, p. 7, July, 1941*

CAMEL

THE CIGARETTE OF COSTLIER TOBACCOS

HYDROSULPHOL

E. C. Lints AND COMPANY, INC., 1000 WEST 6th STREET

THE NEW WEAPON AGAINST BURNS

STIMULATES EPITHELIAL GROWTH

NO INFECTION IN ALL CASES TREATED

For follow-up and ambulatory treatment, Hydrosulphosol Ointment in 1-lb. jars.

a prolific source of Sulfhydryl

NON-TOXIC
can be used
SAFELY and FREELY

MEDICAL REPRINTS ON REQUEST

LOS ANGELES, CAL. . REPRESENTING COTTIE-WILSON LABORATORIE

the whole body several hours after exposure, rarely sooner. This reaction is often brought out by later chilling of the body, as in going home from work or getting into bed between cold sheets.

—*U. S. Department of Labor, Industrial Health Series.* (Quoted in *Digest of Treatment*, November, 1941.)

Argentina

A MEDICAL industrial inspection service has been established in Argentina by the National Department of Labor as part of the Division of Inspection and Safety. The medical inspectors are to enforce certain laws on accidents, health, and safety, advise employers concerning the best methods of preventing accidents and occupational disease; and issue orders, from which appeal may be taken to the president of the Department and to the Council of Industrial Safety which (composed of officials of the National Labor Department) is to stimulate campaigns for safety and industrial-disease prevention; adopt safety standards as a guide for medical inspectors; supervise the setting up of a permanent exhibit of industrial safety; compile the safety laws and regulations in force in the nation, the provinces, and in other countries; arrange for safety conferences in industry; and publish reports based upon findings of the inspectors and analyses of the statistical division of the department.

—(*Labor Standards.*)

The Recruits

THE RECRUITS for industrial practice, as well as for all other specialties in medicine must, of necessity, come from the general medical profession, from the practising physicians who yesterday were interns, and medical students the day before. Those men have had good training. They have had the best training of any physicians graduated from our medical schools. They will require, therefore, perhaps a little less of the tedious training for this specialty, but nevertheless they must have some insight into the intricacies, the hazards, the new processes, the new materials, the environments, and the things they will meet in industries, before they can do their best job for the industrial worker. Industrial practice is now in a position of importance and respectability, comparable to other specialties in medicine. Extreme care, in my opinion, ought to be taken to keep industrial practice in that high position of respectability. I mention this because we are all aware, I believe, that at one time industrial practice did not have quite this position of respectability. Other specialties are developed from private practitioners, and that is the place where industry must recruit its new specialists.

—(R. G. LELAND, M.D., Director of A.M.A.'s Bureau of Medical Economics, at AMERICAN CONFERENCE ON INDUSTRIAL HEALTH, Chicago, November, 1941.)

THE IMPORTANT INDUSTRIAL HEART

The accelerated tempo of defense production calls for closer attention to the vascular condition of the hearts of executive and worker alike.

THE "SIMPLI-TROL" PORTABLE MODEL is contained in one case 8" x 10" x 10" and weighs but 30 pounds. Mobile and Stationary models also available for Hospital and Clinical use. Any model may be arranged to record heart sounds and pulse simultaneously with the electrocardiogram. Send for literature.

The increasing number of Electrocardiographs in use in Industrial Medicine is accordingly of interest to Cardiologists within and without industry. The large number of Cambridge-built instruments so used by progressive companies is equally significant. Such companies are guided in their Electrocardiograph selection by consulting Cardiologists who have been familiar with Cambridge dependability since internship. Many have been trained upon the Cambridge. Secondly, industrialists have excellent facilities for appraising values of such equipment. They want the best and are willing to pay for it.

Every purchaser of a Cambridge obtains an instrument whose records are acceptable to the entire medical world . . . a rugged instrument which assures a lifetime of accurate performance.

CAMBRIDGE INSTRUMENT CO., Inc.,
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Pioneer Manufacturers of the Electrocardiograph

CAMBRIDGE
all-electric
ELECTROCARDIOGRAPH

Emphasis on Toxicity

MATERIALS being manufactured for defense will in many instances give rise to new medical problems. Extensive research is being carried on by the U. S. Public Health Service. The following from its November bulletin covers the matter nicely. "During the current year, the Research Section of the Division of Industrial Hygiene, National Institute of Health, has been engaged in over 125 research projects, and at present has 91 such projects in progress. These studies concern the toxicology of organic substances; the toxicology of inorganic substances; industrial pathology and bacteriology; analytical methods and services; changes in pressure, temperature and humidity, including aviation medicine; and physics (physical methods). Some of these problems will be completed during the current year, and 25 additional problems have been outlined for investigation in the near future. Over 90% of the present work of the Research Section is associated with problems pertinent to national defense. Particular emphasis is being placed on studies of the toxicity of substances such as explosives, solvents, metals used in airplane and munitions manufacture, and components of synthetic rubbers and

—*Continued on page 90*

CLOSE RANKS!

HOW much more than just the unit of *time* plus *human energy* has the word, MAN-HOUR, become. With mingled feelings, the eyes of an entire world are strained upon this measure of accomplishment as we settle into our vital production job. And, despite industry's safety-consciousness—despite personnel training in proper methods, too many of these precious man-hours continue to be lost to the masquerading saboteur—*worker-disability*.

In counter-attack, to keep more men working—more of the time—many industrial physicians across the nation are turning to the use of the G-E Inductotherm. With its deep-tissue heating effectiveness, they treat bursitis, contusions, fractures, dislocations, strains, sprains, and other such obstacles to the industrial capacity we must maintain. By its principle of electromagnetic induction, the Inductotherm generates heat at a greater rate in vascular tissue and muscle than in skin, bone, or fat. This characteristic of maximal heat generation where heat is most useful, assures rapid treatment. And rapid treatment provides the end-result now so important—*faster* patient recovery.

Learn how the Inductotherm can help you to keep more men working—more of the time. For full details, write today for your copy of Pub. D12.

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This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

Industrial Medicine

Reg. U. S. Pat. Off.

The editors will exercise care in checking on the accuracy of data printed, but in all other respects articles and opinions of which expression is allowed are the opinions of their authors—the editors reserving in all cases the right to comment on the same, in the current or any subsequent issues, as they may be inclined.

The Journal of Occupational Diseases and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 11 | February, 1942 | Number 2

Policies and Procedures of an Industrial Medical Department

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THE importance of sound industrial medical programs is being increasingly recognized by industrial management. From both a business and industrial relations standpoint, their value has been proved. This development has led to many changes in the practice of industrial medicine. From first aid stations, often inadequately equipped and poorly staffed, industry has moved toward well-planned and fully-equipped medical departments. These are competently staffed to carry on constructive health maintenance programs as well as to do the necessary first aid work. Health maintenance programs are fitted to the needs of the particular plant, with full regard for existing occupational disease hazards.

The more extensive the industrial medical program becomes, the greater the need for carefully conceived policies and procedures. Practical and effective results must be obtained. Adequate coordination with other departments of the business must exist. These are necessary if the very substantial investments for quarters, equipment and staff are to be justified.

With these needs in mind, some five years ago we undertook to formulate our policies and practices in writing. We had four primary objectives:

1. A statement of policy as the basis for guiding and directing the activities of the medical department.

2. A plan of operation embodying detailed procedure to insure consistent application of these policies.

3. A clear understanding of these policies and plans by all members of our organization as an aid to proper coordination and effective use.

4. A medium for training new personnel in the medical department.

The problem of establishing general policies and a general plan of operation offered no unusual difficulties. That of establishing procedures for carrying on routine work did. This was due to the generally accepted principle that the practice of medicine in any of its branches could not be reduced to rule or formula. It was believed that the plant physician and each nurse must be entirely free to exercise their best judgment, based upon training and experience in dealing with each individual case.

An analysis of this problem, however, disclosed that there exist important differences between industrial medicine and other fields of medical practice, which make it relatively easy to establish not only guiding policies but also specific routine procedures for dealing with most of the work involved. This is true because a substantial percentage of the work of the medical department in any plant will conform to a definite local pattern of type and severity of injury or occupational illness. These are highly repetitive.

As we saw the problem, there was a definite need for:

1. A statement of general policy, clearly defining the functions and responsibilities of the medical department and setting forth management's conception of its responsibility for the safety and health of the individual worker.

2. A policy in regard to the physical examinations to be given as a prerequisite to employment and periodically as a constructive health maintenance program. This to include a definite procedure with necessary forms to insure:

A. Consistency of technique in making examinations.

B. Convenience in recording findings in a manner to facilitate comparisons with each of several examinations.

C. Clarity and consistency of records, to make the resulting data permanently available and easy of interpretation by any competent person.

It should be noted that this is proving very important. The procedures, forms and method of recording findings are so worked out that clarity and comparative values are not lost, even though different physicians make examination.

3. A policy Manual governing the duties of nurses. This clearly defines the technique and procedure for dealing with all frequently re-occurring routine types of cases. Issued over the signature of the plant physician, this provides a medium for training nurses, and assurance that the nurses' duties are automatically carried out under adequate medical supervision. Because of its possible legal importance, this Manual was

reviewed by the plant physician, by other medical consultants on our staff, and also by other authorities in the field of industrial medicine.

4. A procedure, together with the necessary forms, to insure the systematic recording of every case reporting to the medical department, its diagnosis and treatment, with full history until the case is closed.

5. A policy and procedure for dealing with employees who, owing to occupational or non-occupational cause, are physically unqualified to perform their normal duties. It is necessary from an employee relations standpoint to deal with such cases consistently, in order to avoid discrimination. While it is desirable to deal with these situations sympathetically, it is necessary that sympathy be tempered by practical business consideration.

6. A policy, governed largely by legal requirements, and procedure for reporting compensation cases to the state. (We are self insurers.)

We feel that all medical department policies should be reviewed from a medical, a general personnel, and a general operating standpoint. These several points of view are indispensable to sound, constructive policies.

It is likewise important that statements of policy be issued under the authority of senior management to insure their acceptance throughout the organization.

Policies, plans, or procedures appropriate to one organization under a given set of circumstances may be wholly impractical elsewhere. The following summary of our policies and procedures is offered only as suggesting a possible approach. We have endeavored to include only those items that may be of general interest. No attempt has been made to present them in the form in which they appear in the several Plant Manuals, which are the media we use for promulgating policies and procedures.

General Policy

PURPOSE OF MEDICAL DEPARTMENT:

1. The medical department is maintained for the purpose of:

A. Providing adequate first aid treatment for all occupational injuries.

B. Detecting and placing under competent care all cases of occupational illness.

C. Safeguarding the employee's health while at work.

It may not undertake other than first aid treatment or diagnosis or in any way treat non-occupational conditions.

The work of this department shall be conducted in full cooperation with, and without infringement upon, the private medical profession.

HEALTH AND SAFETY OF EMPLOYEES

1. No employee will be permitted to work on any job which will:

A. Endanger his safety or health.

B. Incur unnecessary liability on the part of the company.

2. Employees having physical impairment may be placed only on work approved by the plant physician.

3. Whenever possible, suitable work will be provided for employees who are temporarily restricted because of occupational injury or illness.

4. Employees with non-occupational impairment which disqualifies them for their normal employment may be continued at work only providing suitable work which they are capable of performing in a normal manner is conveniently available. Such special cases require the approval of the personnel director.

PHYSICAL EXAMINATIONS:

1. Each applicant must pass the required medical examination before being hired.

2. Each employee returning from illness, or absence from any cause extending beyond two weeks, must first be approved by the plant physician. These examinations are not usually as detailed as are pre-employment or periodic examinations, but may be as extensive as the plant physician deems necessary.

3. Each employee shall be examined annually, and more frequently if personal health condition or occupational exposure indicates.

4. Examinations requested by employees will be made only when there is reasonable evidence of illness. When made, they shall be sufficiently thorough to establish beyond reasonable doubt whether the employee is suffering from an occupational condition.

5. All physical examinations must be made a matter of permanent record on the standard form.

TREATMENT OF CASES:

1. All treatments beyond normal first aid shall be rendered with particular regard to the legal right of every employee to select a physician of his own choosing.

2. Such treatment shall also be rendered with due regard to our policy which prohibits the plant physician from engaging in private practice, or from performing any service which might reasonably be regarded as infringing upon the rights of local physicians.

3. The plant physician will cooperate in every proper way with the employee's private physician. He will maintain close contact with all occupational cases, their treatment and progress. He will avail himself of the company's legal right to call any physician of its choosing in consultation whenever this seems necessary to protect the interests of the employees or the company.

4. Treatments shall be confined to the plant hospital unless otherwise requested by the employee's physician or unless the case is hospitalized by the plant physician.

5. Treatments given by plant nurses will be under the plant physician's personal or written direction.

Examination Procedure

RATING SYSTEM:

1. Alphabetical symbols will be used in designating physical rating for reference outside of the medical department.

2. Minus (−) and plus (+) symbols will be used in entering medical records.

3. The several classes and their significances are:

Class A or	−	Physically fit for any work.
Class B or	+	Defect is negligible or correctible, otherwise fit for any work.
Class C or	++	Defect limits fitness for work and may or may not need medical attention, but does require medical supervision.
Class D or	+++	Defect is permanent, i.e., amputated member, lost eye, deformity, etc., and limits capacity to perform some types of work. Individual capable of performing certain types of work in a fully satisfactory manner. Requires only normal medical supervision.
Class E or	++++	Defect disqualifies for employment.

PHYSICAL EXAMINATION RECORD

NAME ADDRESS NATIONALITY

1 DATE									
2 REASON									
3 AGE									
4 TEMPERATURE									
5 HEIGHT									
6 WEIGHT									
7 TYPE									
8 VISION—FAR									
9 VISION—NEAR									
10 EYES									
11 EARS									
12 NOSE									
13 TEETH									
14 THROAT									
15 NECK									
16 FINGERS									
17 ARMS									
18 BACK									
19 EQUILIBRIUM									
20 SKIN									
21 LUNGS									
22 HEART									
23 PULSE									
24 HERNIA									
25 PERINEUM									
26 LEGS									
27 FEET									
28 ABDOMEN									
29 BLOOD PRESSURE									
30 RATING									
31 DOCTOR									
32 URINALSIS									
33 BLOOD ANALYSIS									
34 FLUOROSCOPE									
35 X-RAY									

REMARKS

Fig. 1.

Physical Examination Record (This is on an 8½" x 11" card)

4. Classes C and E may not be employed while disqualifying conditions exist. If already employed, these classes require handling subject to instruction of plant physician in conformity with the policy governing restricted employees.

MEDICAL HISTORY RECORDS:

1. Examinations will be recorded on standard form. (See Figs. 1 and 2.)

2. Personal data and medical history will be entered when the initial examination is made.

PERSONAL DATA

FAMILY PHYSICIAN ADDRESS PHONE

IN EMERGENCY NOTIFY ADDRESS PHONE

LAST EMPLOYED BY FROM TO

KIND OF WORK REASON FOR LEAVING

MEDICAL HISTORY

DIGESTION	
APPETITE	RHEUMATISM
LOSS OF STRENGTH	ARTHRITIS
USUAL WEIGHT	NOCTURIA
HEADACHE	ILLNESS
DIZZINESS	PAST: OPERATIONS
SHORTNESS OF BREATH	INJURIES
OEDEMA	
LUMBAGO	

FAMILY HISTORY

MOTHER
FATHER
SISTERS
BROTHERS
TUBERCULOSIS
DIABETES
CANCER
MENTAL

THE FOREGOING STATEMENTS ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT ANY MISSTATEMENT OF FACT IS GROUNDS FOR RELEASE. DATE SIG. WITNESS

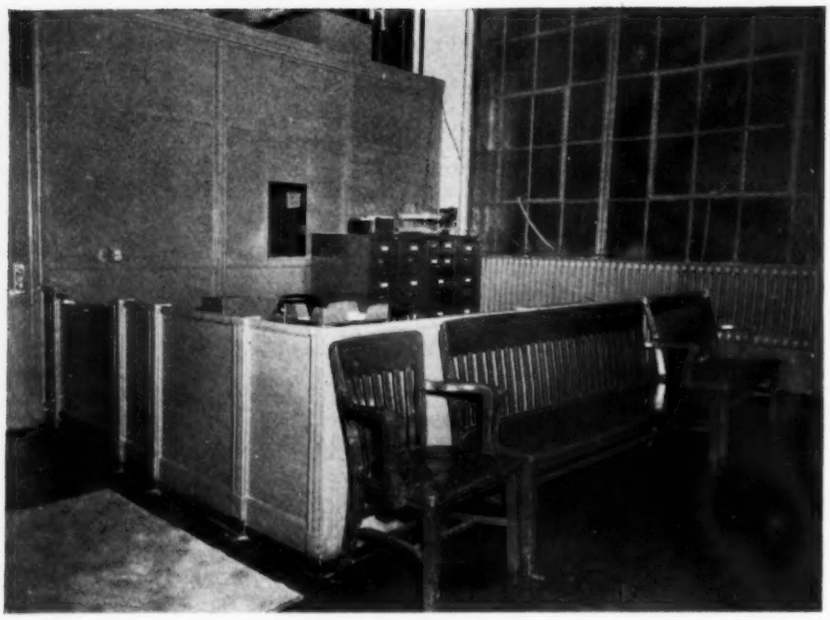
RECORD OF RE-ENTRANCE EXAMINATIONS

NATURE OF ILLNESS OR INJURY	ATTENDING PHYSICIAN	DATE OFF	DATE RET'D	OCCUPATION	REMARKS	PLANT PHYSICIAN

Fig. 2.

Reverse Side of Physical Examination Record

This contains personal data, medical history, family history, and a brief record of examinations after absence because of sickness or other causes



The waiting room, in a corner of which are the receptionist and record clerk

Procedure

THE procedures outlined in the following sections are intended as a guide to establish a minimum but not a maximum standard. They are not intended to discourage more exhaustive examinations when in the plant physician's opinion such are advisable. They in no way lessen the responsibility of the plant physician for the accuracy and completeness of his findings.

1. The plant physician will instruct that the employee stand facing him.

2. The consistency with which this instruction is observed and demeanor during the examination indicate traits such as dependability, timidity, flippancy, stolidity, curiosity, indifference, suspicion, or restlessness.

3. Coincident with these observations, the physical type will be noted, and, in the absence of mental traits or physical characteristics that affect fitness for work, applicant will be rated minus (–) after "Type." If there are any mental traits or physical characteristics that adversely affect fitness for work, indicate by one, two, three, or four plus signs, depending upon importance.

4. EARS, NECK, SCALP, AND CERVICAL SPINE:

A. Examine left and then right ear. Test hearing, observe condition of drum, meatus and external ear.

B. At the same time observe hair for pediculosis and condition of scalp, look for mastoid scars and physical defects in neck.

C. Turning applicant's head to give view to each ear indicates rotary flexibility of cervical spine (arthritis).

5. EYES, SINUSES, AND CERVICAL SPINE:

A. Observe size, shape and reflexes of pupils, condition of conjunctiva, sclera and lids, also mobility of eyeballs and lids.

B. Note especially scars and other defects from injuries, the disturbed pupillary reflexes of tabes dorsalis, the bulging eye and lagging lids of exophthalmos, the yellow sclera of jaundice, the congested conjunctiva of the alcoholic, and the swaying of Romberg when eyes are closed.

C. Apply pressure above and below eyes, seeking sensitive spots in the frontal and maxillary sinuses (sinusitis), incidentally bend neck forward and backward, again checking cervical arthritis.

6. NOSE:

A. Examine nose, nasal apertures, condition of turbinates, presence of polypi and nasal discharge.

7. MOUTH, ETC.:

A. Next examine lips, buccal and pharyngeal cavities, observing mucous membranes, teeth, gums, tongue, tonsils, pharyngeal walls.

B. Special attention should be paid to anemia, cyanosis, mucous patches, pyorrhea, badly cavitated teeth, infected teeth or teeth roots, and infected tonsils.

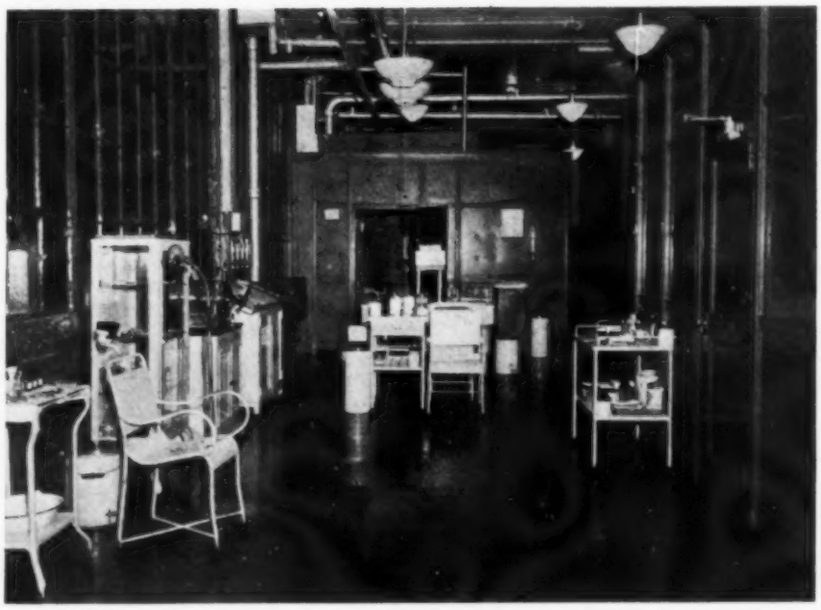
C. Particular care should be exercised in looking for infected teeth and tonsils. In making these observations it should be remembered that it is contrary to company policy to employ anyone who has serious focal infection, whether teeth or tonsils, until such condition has been corrected.

8. NECK AND LUNG APEXES:

A. Pass hands over the back, sides and front of the neck. Note the presence of deformities, glandular diseases and enlargements of the thyroid gland.

B. From the neck, drop hands to the regions above and below the collar bones, noting especially the expansion of the apexes of the lungs and the position of the shoulder girdle in respiration. Pulmonary tuberculosis usually affects the lung apexes first.

A view of the examination room. To the left are disrobing rooms



A view of the general treatment room

9. ARMS, ETC.:

A. Instruct applicant to hold hands out in front with palms down.

B. Inspect for tremors in fingers, deformities, scars, etc.

C. Instruct applicant to turn the hands over and make similar observations. This will indicate impairments in pronation and supination.

D. Instruct applicant to close the hands, bend the wrists, bend the elbows, hold the arms out, and finally to raise them above the head. This will indicate impairments in the various joints of the arms and give opportunity to scan both arms for scars, old injuries, etc.

10. DORSAL, LUMBAR SPINE AND EQUILIBRIUM:

A. While arms are still extended above head, instruct applicant to bend over and touch floor, also to right and to left.

B. This will reveal stiffness in the back (arthritis) and the presence of skin disease, tumors or other abnormalities on the back.

C. Instruct applicant to close eyes and observe the extent to which he sways, as a test for equilibrium. This may be augmented by various orientation tests while eyes are closed. All of these are clues to tabes and other diseases of the central nervous system.

11. CHEST:

A. Examine chest for signs of disease of the pleura, lungs, heart, air passages and blood vessels.

B. There are several important conditions to be found in this region: Silicosis, pulmonary tuberculosis, pleurisy, chronic bronchitis, aneurysm, and defects in the heart, all or any of which will have a direct bearing upon an applicant's placement rating.

C. Have x-rayed after all other phases of physical examination have been satisfactorily passed.

12. PERINEUM:

A. Instruct applicant to bend over and spread buttocks with hands to expose anus and then note hemorrhoids, perianal sinuses, and dimpling over coccyx, suggesting some underlying pathology.

B. With applicant standing, examine for penile lesions and pathology of scrotum, testicles, epididymis and spermatic cord.

13. HERNIA:

A. In examining for hernia it should be borne in mind that there are several kinds: umbilical, incisional, inguinal and femoral.

B. Abdominal scars indicate prior operations and offer some verification of applicant's medical history.

C. An applicant with unusually large rings, or other evidence of susceptibility to hernia, will not usually be employed.

14. SKIN CONDITIONS:

A. Examination to this point will afford opportunity to observe the condition of the skin on the various parts of the body. These observations should now be recorded.

15. JOINT FLEXIBILITY:

A. Instruct applicant to lie on the examination table.

B. The facility with which he does so gives an opportunity to observe suppleness and joint flexibility, especially in the back and hips.

16. ABDOMEN, HEART, LUNGS:

A. Examine for masses, sensitive spots, and other signs of disease. The conditions to be found are numerous: gall-bladder, stomach diseases, appendicitis and cancer are perhaps the most important.

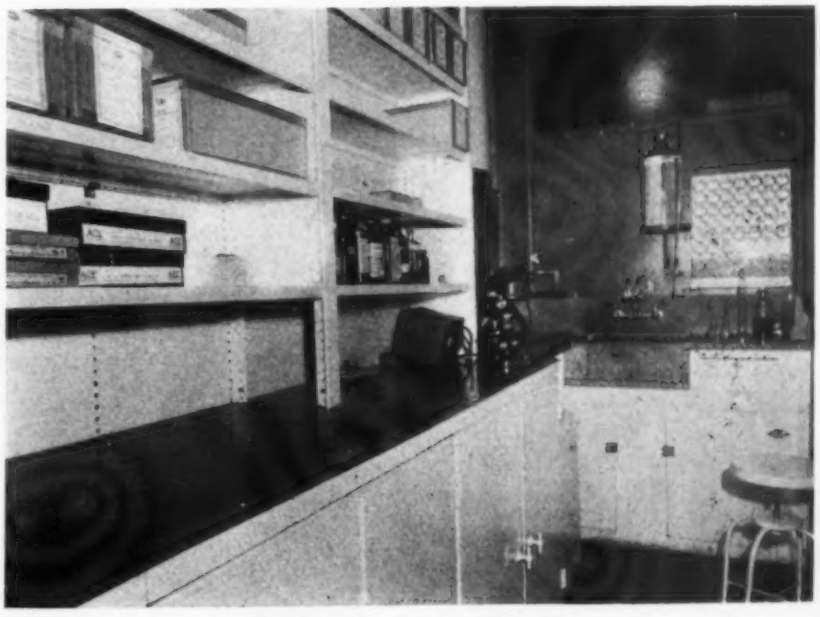
B. While applicant is lying down, re-check heart and lungs for verification of previous findings.

17. SACRO-ILIAC AND HIP JOINTS:

A. Hip joints and sacro-iliac joints should be carefully examined.

B. Painful sacro-iliac joints are particularly important.

C. When there is any question of a joint condition, the applicant should be rejected pending repair or, in the case of an employee, strict medical supervision should be exercised.



The laboratory and supply room

18. LEGS, ETC.:

A. Instruct applicant to sit on table with feet hanging down.

B. Examine both legs and both feet and test reflexes.

C. Look for stiff and deformed joints, scars and impairments from injury, flat feet, deformed toes, varicosed veins and ulcers, dermatitis, etc.

D. Where varicosed veins exist to any serious extent, or where there is any likelihood of walking or working on one's feet aggravating an existing condition, the applicant should be rejected. If the examinee is already employed, the case should be placed under strict medical supervision.

19. BLOOD PRESSURE:

A. The blood pressure reading should be taken at this time as it is not likely to be influenced by nervousness or excitement, as subject has become accustomed to the examination.

B. Readings are mandatory for all employees.

20. URINALYSIS; WASSERMANN:

A. Urinalysis and Wassermann tests are mandatory for all employees.

21. SPECIAL TESTS:

A. Unusual or obscure findings will suggest the need for special attention. This applies to the rectum, genitalia and other parts not specified on examination card. The prostate gland should be examined when applicant is over 50.

B. Special tests and examinations will be required at the discretion of the plant physician.

22. GAIT:

A. Observe applicant's gait as he steps into dressing room for indications of nervousness, general physical set-up, etc.

Nurses' Manual

GENERAL INSTRUCTIONS:

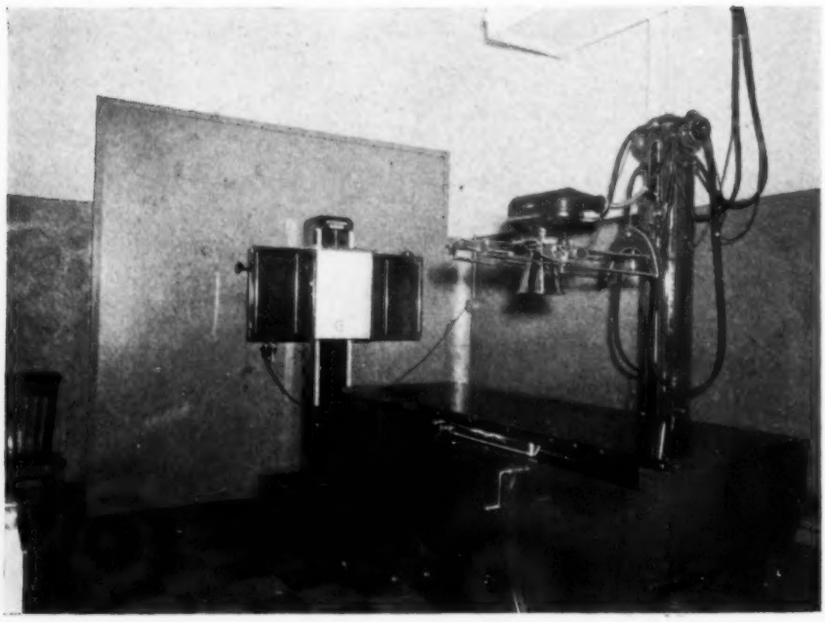
1. Treatment instructions may only be issued by the plant physician or, in his absence, by the acting plant physician.

2. Such instructions must be in writing if they are of a permanent nature. Whenever practical they should be issued in amplification of, or as amendments to, this Manual.

3. This Manual, and amendments or alterations thereto, require the signature of the plant physician and the approval of the personnel director.

4. Nurses must refrain from doing anything which might be construed as practicing medicine. Their duties must be performed under the supervision and direction of the plant physician or, in his absence, the acting plant physician.

5. This Manual does not relieve any nurse from full responsibility for using his, or her, best judgment based on training and experience in handling each case. *Not less care* than that suggested by this Manual is to be used. Emergencies will arise which must be dealt with by the nurse entirely independent of instructions contained herein. Each such case, however, must be referred to the plant physician, the acting plant physician, or to a staff physician, promptly.



A corner of the x-ray department

6. Nurses may not treat any injury which did not occur on company property, unless specifically instructed by the plant physician to do so.

TREATMENT INSTRUCTIONS:

1. ABRASIONS — See Lacerations.

2. BLISTERS:

A. Cleanse the area with soap and water, and

B. Apply one of the organic mercurial antiseptics, and

C. Apply dressing as outlined under Section 12, Paragraph 3.

3. FLUX BURNS:

A. Cleanse thoroughly with soap and water to a distance of at least two inches from the burned area. If the burn is on a finger, cleanse the whole finger.

B. Apply carbuncle ointment.

C. Apply dressing as outlined under Section 12, Paragraph 3. Dressing must be removed by the medical department at least once daily.

D. When the so-called "core" comes out, apply one of the organic mercurial antiseptics and dry dressing.

E. If, after one of the organic mercurial antiseptics and dry dressing have been applied, the injury becomes sore, the case will be referred immediately to the plant physician. Pending his examination:

(a) If only slight soreness, return to use of carbuncle ointment.

(b) If moderate to severe soreness, use hot boric acid bath.

4. COLDS AND COUGHS:

A. If cough or cold is severe, refer to plant physician.

B. If cough or cold appears slight, with only mild throat irritation, no temperature and pulse ranging from 70 to 90, the nurse may:

(a) Apply drops of ephedrine solution to nostrils in accordance with standing instructions given by plant physician.

(b) Give cough medicine and/or throat lozenges of the kind and in an amount which has been approved by the plant physician.

C. In the absence of the plant physician, the nurse may treat as under B above, any case which would otherwise be referred to him. Such cases must be scheduled for the plant physician at the earliest possible time or, if severe, they must be sent home with instructions to report to their own physician.

5. DERMATITIS:

A. All cases of dermatitis are to be seen by the plant physician.

B. Pending examination by plant physician, a routine treatment of calamine ointment and a protective dressing may be applied.

6. EYE INJURIES — FOREIGN BODIES IN EYES:

A. Solder or other burns of the skin around the eye in which no foreign matter enters eye may be treated as any other minor skin burn with the exception that only boric acid ointment or white vaseline may be used.

B. If solder or other hot substance enters an eye, the following steps are to be taken in order:

(a) Apply first aid treatment of:
   1. Sterile castor oil.
   2. Local anesthetic provided for this purpose, if required.
   3. Gauze bandage to protect the eye.

(b) Call plant physician or, in his absence, refer case to an oculist *at once*. All such cases must be taken to the oculist's office by car and escort, or he must be called to the plant.

(c) If case occurs at night, or when an oculist is not available, call plant physician or staff physician at once. *Take no chances with eye cases.*

C. Nurse may use cotton swab, or applicator wrapped in cotton and moistened in sterilized water, in removing floating foreign bodies which are clearly visible and which are *not* on cornea. *Do not attempt to remove foreign body from cornea.*

D. *Nurse may not use spud or other sharp instrument* in the eye at any time for any purpose.

E. If patient gives history of injury which suggests that metallic particles may be in the eye, even though only nominal pain results, the case must be referred to the plant physician or, in his absence, to an oculist or staff physician if the oculist is unavailable, *at once.*

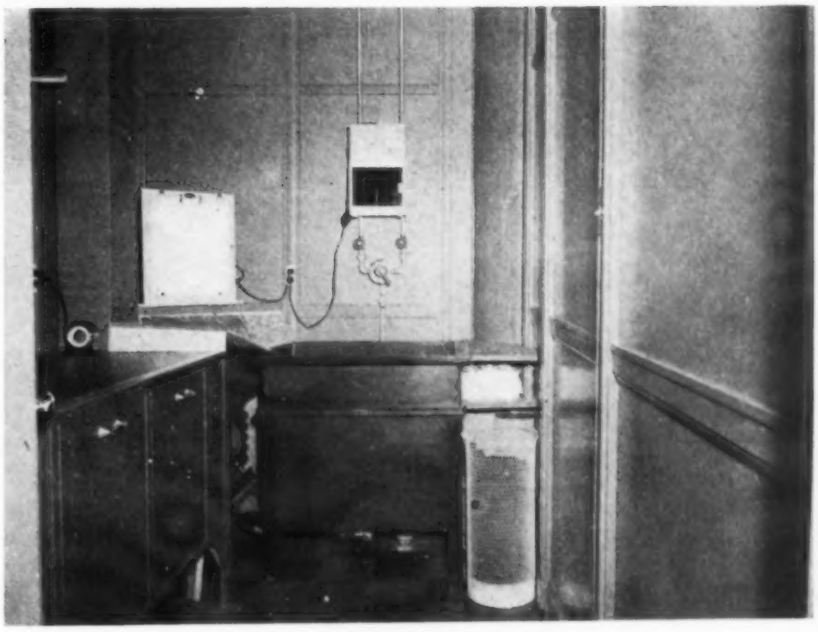
F. If nurse cannot see foreign body, the case must be referred to plant physician or, in his absence, to an oculist, or staff physician for further examination. *Under no circumstances* may nurse close case on assumption that foreign body is not in eye if there is any history of foreign body having been felt by patient.

7. FOREIGN BODIES — OTHER THAN IN EYES:

A. Foreign bodies which can be removed without making an incision of any nature may be removed by the nurse. Such cases must be seen by the plant physician at time of first re-dressing.

B. Foreign bodies which cannot be removed as under "A" must be referred to the plant physician.

C. If foreign bodies which are reported on shifts during which the plant physician is not on duty are not removable by the nurse acting under these instructions, the nurse must send the employee to his physician unless certain that his continuing at work will not complicate the case. Whether continued at work or sent home, the employee must be instructed to report to plant physician the following day.



The darkroom

8. HEADACHES:

A. For simple headache, with no temperature and no history of injury, the nurse may give one to three aspirin tablets providing patient states that he suffers no ill effects from taking aspirin.

B. For headache accompanied by other symptoms such as dizziness, nausea, vomiting, stiff neck, injury, etc., the nurse must refer the case to the plant physician. No treatment may be given except under plant physician's instructions.

C. The exceptions to the foregoing are cases reporting to the medical department during other than regular office hours of plant physician. For such cases, the nurse will use reasonable discretion. Every such case must be referred to the plant physician during the following day. If any doubt exists as to such cases being purely minor, the plant physician or a staff physician must be consulted by 'phone immediately and treatment given under instructions only.

9. HEAT TREATMENTS:

A. Wet baths of saturated solution of boric acid shall be maintained at an approximate temperature of 110°-120°.

B. Wet baths will be used as directed elsewhere in these instructions or as directed by the plant physician.

C. Bakes or light treatment may be used at nurse's discretion for treating sprains, etc., in the absence of the plant physician, but all such cases will be referred to the plant physician the following day.

10. INDIGESTION AND STOMACH COMPLAINTS:

A. Every such case is to be referred to plant physician.

B. If case occurs on a shift during which plant physician is not available the nurse will:

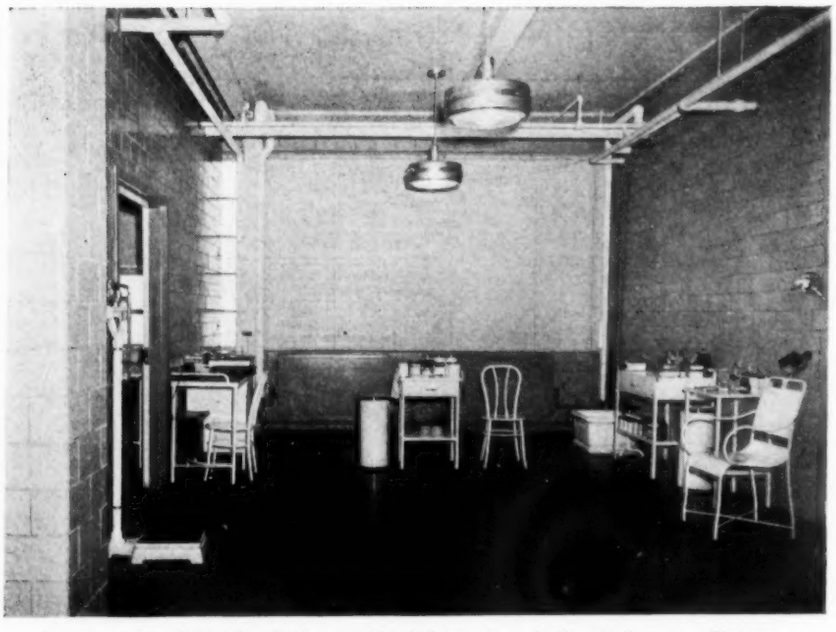
(a) Take temperature.

(b) Check for abdominal soreness.

If either high temperature or abdominal soreness exists, the employee will be sent home and instructed to report to the plant physician the following day with further explicit advice to call his own physician if he gets worse.

If neither exists, nurse may give dose of bicarbonate of soda or other approved palliative as temporary relief, with instructions to report to the plant physician the following day.

If in doubt as to seriousness of case, call plant physician or staff physician at once.



A view of a branch of the medical department, located some distance from the master medical department

11. INFECTION:

A. Every case of infection, regardless of cause or how minor, must be referred to the plant physician.

B. Infection may only be treated under specific instructions from the plant physician, subject to "C" below.

C. Infection reported on shift during which plant physician is not available, is to be handled thus:

(a) If infection appears *minor* and *is not* accompanied by an increase in temperature, a wet heat treatment may be applied, followed by a protective dressing and the employee sent to his home with instructions to report to the plant physician the following day.

(b) If infection appears extensive, or if accompanied by an increase in temperature, call plant physician, or the staff physician for instructions.

D. Refer to HEAT TREATMENTS —Section 9 above, for detailed instructions governing the type of treatment.

12. LACERATIONS—ABRASIONS:

A. The following instructions apply to initial treatment of minor cuts and abrasions and to re-dressings unless otherwise instructed by plant physician.

B. Dress as follows:

(a) Cleanse the injury and surrounding area for two inches with soap and water. If a finger, cleanse entire finger.

(b) Apply one of the organic mercurial antiseptics.

(c) Apply gauze dressing (Redidressing if size of wound permits) and instruct patient that this is not to be removed by other than plant physician or nurse.

(d) Apply a protective gauze bandage over first dressing and instruct patient that this protective dressing may be removed at end of shift, thus leaving clean dressing to be worn until removed by plant physician or nurse.

(e) If required to protect from water, etc., a wrapping of oiled silk or finger cot may be applied over the first dressing before applying top protective dressing. This may also be removed by patient at end of day.

C. Instruct each patient to return for re-dressing at once if first dressing becomes wet.

D. Instruct each patient to report back to medical department immediately if any undue soreness, pain, or throbbing is experienced. Each such case will be referred to the plant physician, or a staff physician as promptly as possible. When indications of infection are not severe, the injured area may be soaked in wet bath for from one-half to one hour pending examination by plant or staff physician.

E. If infection appears extensive or acute, plant physician or staff physician must be called at once.

Case Records

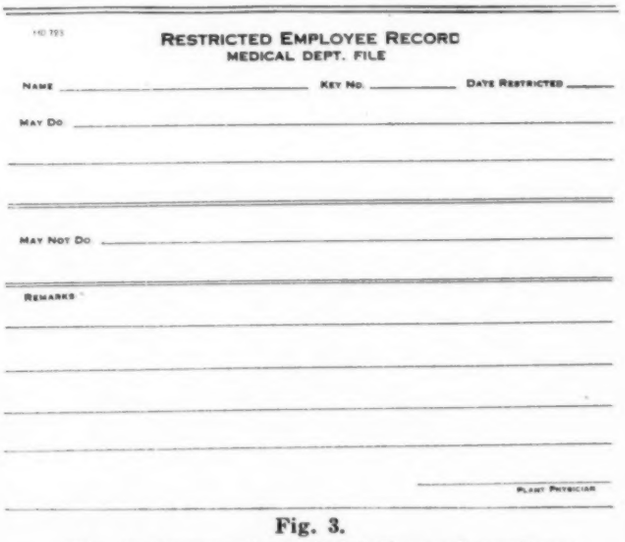
WE have found it satisfactory to enter the simpler types of routine calls to the medical department in a log. This shows data, time, name of employee, clock number, and nature of call.

All other cases are entered in individual case records which carry complete data from start to closing of the case. The form opposite (Fig. 4, page 55) is used, and is self-explanatory.

Case records are filed permanently in the medical history folder of the employee. The logs are retained indefinitely.

Physically Restricted Employees

WE have indicated the general policy for dealing with these cases elsewhere in this article. It is not felt that the detailed procedure is of sufficient general interest to warrant inclusion here. Briefly, within the medical department, case cards are indexed by employee's name and also by department where employed. Each foreman is given a list of the restricted employees within his department which indicates the type of work to which the individual may be as-



RESTRICTED EMPLOYEE RECORD
MEDICAL DEPT. FILE

NAME _____ KEY NO. _____ DATE RESTRICTED _____

MAY DO _____

MAY NOT DO _____

REMARKS

_____
PLANT PHYSICIAN

Fig. 3.

This is the record of all handicapped employees who are under the supervision of the medical department

HOSPITAL CASE RECORD—HARRISON DIVISION—G. M. C.

Name..... Clock No..... Dept.....

Address..... Occupation..... Age..... Sex.....

L	LOCATION OF INJURY	R		REASON FOR VISIT
	Head			Laceration
	Face			Contusion
	Eye			Contusion and laceration
	Nose			Contusion and abrasion
	Ear			Abrasion
	Neck			Incised wound
	Shoulder			Punctured wound
	Arm			Foreign body
	Elbow			Infection
	Forearm			Cellulitis
	Wrist			Chemical dermatitis
	Hand			Sprain
	Finger			Strain
	Thumb			Dislocation
	Chest			Fracture—
	Abdomen			Part. traum. amputation
	Back			Traumatic amputation
	Buttock			Crushing injury
	Hip			Hot metal burn—
	Thigh			Fluid burn—
	Knee			Elec. cont. burn—
	Leg			Elec. flash burn—
	Ankle			Electrical flash
	Foot			Flame burn—
	Toe			Chemical burn—
				Friction burn—
				Hernia
				General medical

Date of injury..... Time..... Date reported..... Time.....

History:.....

Diagnosis:.....

Treatment:.....

Disposition:.....

Probable disability:..... Treated by.....

Certified: Date..... Plant Physician

Fig. 4.

This is a record of occupational injuries or diseases. One is made out for each case. On the reverse side, the progress of the case is recorded

signed. These lists are kept up to date. Likewise, this information is recorded and kept up to date on the personnel records within the personnel department. These cases receive whatever special medical supervision is deemed necessary by plant physician.

It should be emphasized that every reasonable effort is made to find jobs which the individual can satisfactorily perform, particularly for older employees. These cases may be highly restricted, but it is surprising how much work can be found which the restricted individual can do in a thoroughly satisfactory manner if only a little thought is given to this problem.

Compensation Reporting

THIS Manual covers types of cases to be reported, method of computing lost time, detailed procedure for preparing reports, filing, etc.

Plant Physician's Plant Inspection Report

NOT mentioned previously is our policy of requiring that the plant physician make regular general inspections of the entire plant and very specific inspections of all occupational disease hazard areas. Aiding him in this work are the regular routine air analyses made throughout all areas where lead or other toxic elements are used.

These inspections not only serve to safeguard against health hazards and insure sanitary working conditions, but also acquaint the plant physician with the employee at work and the work performed. He needs to know the shop and work surroundings.

Any unsatisfactory conditions found, are reported on a standard form to those who are responsible for their correction. Each such report is followed to completion.

[THE development of our policies and procedures and of the Manuals outlining them which this article summarizes was under the direct guidance of C. D. SELBY, M.D., Medical Consultant of General Motors Corporation. We are also particularly indebted to DOCTORS H. U. CRAMER and F. W. BARRY, of Lockport, New York, and DR. ROBERT E. KEHOE, of the University of Cincinnati, DR. W. A. SAWYER, of Eastman Kodak Company, and DR. W. J. MCCONNELL, of Metropolitan Life.]

The Four Commonest Hand Dermatoses

THEODORE CORNBLEET, M.D.,
Chicago

THE hand as an external part and the organ most in contact with materials is subject to several skin diseases particularly. Four entities constitute about 90% of all the dermatoses affecting this part. They are (1) eczematoid ringworm, (2) nummular eczema, (3) eczema, and (4) dermatitis venenata or contact dermatitis.

Eczematoid Ringworm

ECZEMATOID ringworm is the only one of the four which primarily affects the palmar surface. If the backs of the fingers or of the hand are involved, then it is as an extension process almost always and this may spread to either surface of the wrist. The primary lesion is a vesicle, a pustule or a bulla. From these a scaling dermatitis develops, which may be acute or chronic. When the dermatitis becomes chronic it is punctuated from time to time, usually in hot weather, by acute episodes when fresh vesicles and blisters appear. Evidence of the primary lesions usually can be seen in the form of collarette, undermined scales. The patches of dermatitis are generally sharply outlined.

From the Department of Dermatology, University of Illinois College of Medicine, Service of DR. F. E. SENEAR. Presented at a meeting of the CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY, December 10, 1941.

Long standing cases may become keratotic. Itching is usually present in some degree and in the severely acute phases there may be some pain.

The cause of eczematoid ringworm is a fungous infection with the fungi imperfecti. These may be recovered from the scales and primary lesions in some cases. Bits of material from the lesions are planted on surgary media and the character of the colonies and morphologic qualities of the growth help to classify the organism. These small particles may be likewise used for more direct examination for the fungi by immersing them in 10-40% sodium or potassium hydroxide. After a few minutes the material is observed through a microscope. In many instances fungi cannot be recovered from the hand lesions. It is believed that in some of these cases no fungi at all are present in the lesions. It is held that the lesions in such instances result from sensitization to products of fungi present at another cutaneous site. This latter is almost always on the soles or toes. With or without the presence of fungi in the hand lesions, however, the soles and toes are commonly affected at the same time.

Two disorders that affect the palm deserve attention for differential purposes. The first is the so-called pustular psoriasis. In this, scaling patches that contain insets of small shallow lakes of pus are present primarily on the thenar and hypothenar eminences. There may be ordinary patches of psoriasis elsewhere or these may appear after a long interval or never. The second entity to differentiate is the so-called recalcitrant eruption of the palms and soles described by Andrews. This is a scaling, chronic, superficial dermatitis best seen in the middle of the palm and sole, and, as the name indicates, resistant to all ordinary forms of treatment. The best results have followed the elimination of infectious foci, as under teeth and in the tonsils. Other dermatoses are differentiated in the accompanying table. There is no specific treatment for ringworm of the palms. Prophylactic measures should be carried out wherever possible. These include treatment of infected persons to prevent communication to others and the use of disinfectant foot baths and sprays about swimming pools, public baths, and gymnasiums. Acute infections of the hand are best treated with wet dressings of Liq. aluminum subacetate, one part to 15 of water or of potassium permanganate 1-to-8:10,000 solution. These dressings should be continuous until the degree of acuity subsides. Then a 10% borated vaseline or cold cream ointment may be used during the day and at night 10% powdered boric acid in equal parts of zinc oxide and talcum liberally applied to the hand and kept in place with white cotton gloves. After several days a modified compound benzoic acid ointment may be used, beginning with 2% salicylic acid and 4% benzoic acid in petrolatum. If the dermatitis is chronic or thickened the latter ointment may be used in stronger concentration, up to 6% for the salicylic acid and 12% for the benzoic acid. There are numerous antiseptics which are used, but there is none which is outstanding in its value and certainly not specific. Strong agents which may excite a dermatitis on their own account should not be used. Reliance rather should be placed on conservative measures and which combine a slow exfoliative with some antiseptic action. X-ray exposures made judiciously may be of considerable help. Soap and water aggravate, and their use should be reduced to a minimum.

Of the remaining three dermatoses which most commonly involve the hands and fingers, all affect primarily the dorsal surfaces. The most important of the three is dermatitis venenata or that due to contact with an irritant. The substance may be a primary irritant, that is, of such nature as to irritate most subjects coming in contact with it. Usually, however, the agent is one which will excite a dermatitis in isolated persons who have become hypersensitive to it. The degree of inflammation varies widely between mild erythema to even gangrene. It is usual for an erythematous dermatitis with perhaps some vesiculation and bullae to be present in acute instances. Crusting may follow vesiculation. In the sub-acute and chronic varieties no exudate is present but the skin becomes thickened, scaly and pigmented. The dermatitis is usually not well outlined and may extend toward the palmar surface and onto the wrist, forearm and even higher.

It is well to suspect any dermatitis on the hand of being due in part or totally to an external irritant. The list of agents known to cause contact dermatitis is well-nigh endless. Materials and processes employed in some of the trades and industries have been classified as to their irritant capacities and the kind of dermatitis they induce. The U. S. Public Health Service is doing much to coordinate such information and can be of great assistance in working out the pathogenesis in any industry and its products. To find the cause in a specific instance a good history is of great assistance in furnishing a clue. The details of the patient's activities must be carefully scrutinized. He may come in contact with the irritant sought while at work, while engaged at a hobby, or in some sport. Such materials which come under suspicion are tested on the patient's skin, using the so-called patch test. They are placed on non-involved, intact skin such as on the forearm near the bend of the elbow. If many substances are to be tested, then the back is used as a site, if it is not irritated. These materials are covered with an impervious material and fastened to the skin by adhesive. There are variations in the method of putting on the patch of material. It is left in place for 24 to 48 hours and then removed. A positive test is denoted by a dermatitis being present where the material in question rested on the skin. The interpretation of the results of this seemingly simple procedure may be involved and is fraught with pitfalls. Both false positive and negative results may take place. Considerable care and thought are necessary to avoid mistakes. One must be sure, for example, that the substance used in the test is not a primary irritant, such as a stronger acid that would produce a dermatitis in most persons; or that the so-called positive test resulted from the material under question and not the adhesive plaster used to fasten it to the skin.

The first principle in the treatment of contact dermatitis is to remove the offending agent and, parenthetically, to avoid and prevent exposure to substances known to be common irritants. For the very acute inflammations wet dressings are the most useful. Saturated solution of boric acid or 0.5% aluminum subacetate solution are simple and reliable remedies. For sub-acute degrees calamine lotion with 2 or 3% liquor carbonis detergeus added is soothing and antipruritic. Inert dusting powders such as equal parts of zinc oxide and talcum are useful in this stage as are also pastes, exemplified by the well-known Lassar's paste. Chronic states need more stimulating remedies best used in ointment form. Boric acid ointment may be thus employed and (a series of others of increasing intensity cautiously ascended) 3 to 20% Ichthyol in equal parts of lanolin and petrolatum, 5 to 30% Naftalan ointment in petrolatum, 1 to 6% washed crude coal tar with 6% zinc oxide, 1% aluminum subacetate solution in equal parts of petrolatum and anhydrous

lanolin. X-rays are useful in allaying irritation and itching and facilitating absorption of tissue exudates. If the offending agent has been removed there is usually little trouble in bringing about a cure. When the dermatitis on the hands is but part of larger area of the skin involved, the problem becomes more involved and may warrant systemic measures, such as the intravenous injection of one grain of sodium thiosulphate in 10% solution every other day or at longer intervals.

Nummular Eczema

THIS has a number of synonyms such as parasitic eczema, eczematoid dermatitis, orbicular eczema. Its most characteristic site is the back of the hand. It is usually unilateral (but not symmetrical if bilateral). The lesions consist of sharply outlined discs about 1/4 to 1 inch in diameter on an average and raised above the skin. The surface is irregular and covered by crust, scale or freshly oozing serum. The elements of these circles can be identified as closely set papules or vesicles. These vesicles are moderately deep, between the more superficial ones of eczema and the deeper ones of eczematoid ringworm. The patches may be occupied solidly or may clear at the center. In some cases adjacent lesions may coalesce and produce arciform figures. Itching is prominent. Chronicity, stubborness and tendency towards recurrence are the rule.

The cause of this affection is not known. Predisposing and aggravating factors are cold weather, soap and water, irritants of all kinds, degreasing agents. Anything which chaps the hands provides the means in the predisposed. Some think that contact with oils aids its production. Parasitic agents, fungi and allergens are not found at its basis.

The absence of fungi and cocci in the lesions differentiates it from tinea circinata and pyodermas. Erythema multiforme occurs symmetrically on the hands, has a shorter and more definite and self-limited course and involves other sites not often subject to nummular eczema. Granuloma annulare is more indurated, smoother and more nearly skin color. Doubtful cases are easily identified histologically.

The treatment is mostly by local applications. Unlike other forms of acute eczema, stimulants and parasiticides do not irritate nummular eczema but are helpful. Drying paints such as 1 or 2% silver nitrate, 1% potassium permanganate or 1 to 5% silver nitrate are helpful. Wet dressings of these agents well diluted are also of benefit. Best of all is the use of crude coal tar. It may be used in some cases full strength as a paint, but usually is most helpful in ointment form in 6% strength with an equal quantity of zinc oxide in petrolatum. In some instances 30% sulphur in petrolatum helps. X-rays at times help to clear the lesions, but many times are valueless or even aggravating. Anything which opposes chapping the skin prevents extension and recurrence.

Eczema

THIS term is obsolete to some and has different meanings to others. To many it has come to mean the changes in the skin due to irritation from contact agents. It is not used in that sense here but rather its older meaning associated with a constitutional background — that kind of dermatitis which is known today as atopic eczema or neurodermatitis and related to asthma and hay-fever.

Eczema involves the backs of the hands besides other areas. The patches are ill-defined, most active in the center and composed of tiny vesicles of uniform size. These latter are thin-walled and superficial so that they break easily. The extruded material dries into crusts. Secondary infection with pyogenic organisms may add an element of impetigo. The disorder itches severely, and scratching predisposes to secondary infection and produces excoriations. Papular and erythematous varieties are common and all forms lead to thickening with chronicity. These thickened patches are inelastic and become fissured, which is followed by pain.

The subjects of eczema come from families some of whose members give a history of having hay-fever, asthma or eczema. They may have dry or excessively oily skin which is more easily traumatized or irritated by weather or chemicals. Other disease processes that the patient may have, such as diabetes and nephritis, may influence the presence and character of the eczema. Infections of diverse types can repercuss themselves in eczema, thus infections in foci or with pyogens, yeast and ringworm organisms may be adverse influences. Further determinants for production of an eczema may be external irritants, endocrine imbalances, as well as nervous and psychical influences.

Scratch and intracutaneous skin tests with various allergens may be made which sometimes uncover food, inhalant or environmental factors causing or aggravating an eczema. By a thorough history and physical examination aided by the laboratory, studies may expose some of the underlying factors referred to above. Their elimination or correction may result in improvement of the skin. Usually some form of local therapy is necessary in addition to the general measures suggested to obtain the maximum benefits.

The use of soap and water should be prohibited. Soap substitutes, such as sulphonated oils, saturated solution of boric acid and colloidal solutions made with cooked oatmeal in water or Linit in water are well tolerated in washing, or the skin may be cleaned with bland oils and creams. For acute exacerbations wet dressings of saturated boric acid solution or aluminum subacetate solution one part diluted in 10 to 16 parts of water are among the most useful.

The general principles for topical medication are followed here as elsewhere — mild soothing agents in acute states and more stimulating ones in sub-acute and chronic stages. For acute cases, wet dressings afford the greatest relief and are safe. Saturated aqueous solution of boric acid, solution of aluminum subacetate diluted 15 times in water are excellent. If there is an added element of secondary pyogenic infection, the wet dressings may be made of potassium permanganate solution in water, 1-to-3,000: 10,000. If itching is severe, antipruritics such as phenol, 1 to 2% or menthol 0.25 to 0.5% in a shake lotion such as calamine lotion. The lotion may be alternated with the wet dressings.

When eczema becomes less acute the wet dressings may be applied less often or for shorter intervals or abandoned. The shake lotions such as calamine lotion may now be used entirely. If the wet dressings have dried the skin unduly, calamine liniment may be used instead of the lotion. As the lesions attain a state of chronicity, stimulating agents may be added. They may be put into the calamine lotion or liniment. The simplest is Ichthyol from 5 to 20%. More stimulating is coal tar solution or Liq. carbonis detergeus 3 to 10%. In the place of shake lotions, pastes such as Lassar's may be used. This also has antipruritic properties. As the lesions become more torpid and thickened, creams and ointments are used to advantage. The bases used may be of animal, vegetable or mineral origin. Combinations of these seek to combine the individual ad-

TABLE OF DIFFERENTIAL DIAGNOSIS OF THE FOUR COMMON DERMATOSES OF THE HAND

	Eczema Ringworm	Nummular Eczema	Dermatitis Venenata	Eczema
Location	Palms	Dorsum	Dorsum	Dorsum
Other locations	Feet, Nails, crural	Forearms	Other exposed parts (forearms, face, neck)	
Bilateral	Usually	Often unilateral	Bilateral	Bilateral
Primary lesion	Vesicle	Papule Vesicle Pustule	Vesico-bullous	Papule Vesicle
Uniformity lesions	Very variable	Somewhat variable	Very variable	Uniform
Depth	Deepest	Fairly deep	Superficial	Superficial
Greatest activity	Peripheral	Peripheral	Central	Central
Central involution	Yes	Often	None	None
Sealing	Peripheral, undetermined	Peripheral, sometimes undetermined	General	General
Coalescence of primary lesion	Little	Little	Yes	Yes
Borders	Sharply defined	Sharply defined	Poor or moderately sharp	Poor
Itching	Moderate	Slight	Moderate	Intense
Special features	Fungus found. "Ids" often occur.*		History of exposure to irritants	

*Sterile reaction forms from infections on feet. Fungi found in scales between toes or on soles, but not in those from hands.

vantages. An example of such a compromise is equal parts of lanolin and petrolatum. If the anhydrous lanolin is used, agents dissolved in water may be incorporated. For the thickened chronic patches of eczema, ointments containing stimulating agents such as resorcin 2 to 10%, crude coal tar 1 to 6%. The latter may sometimes be used in full strength advantageously. Still more stimulating agents are chrysarobin 1 to 10% and anthralin 0.1 to 0.5%. Great care should be exercised before employing these very strong reducing agents for they are capable of irritation unless the patches of eczema are of the most chronic, dry and thickened character. X-rays are extremely useful in all states of eczema for their antipruritic properties and their capacity to induce the absorption of exudates. This modality is capable of great harm if used improperly; they should not be used unless one has expert knowledge of their action.

Whither Industrial Medicine?

—Observations on Certain Economic and Social Factors—

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IN the light of current events it behooves every American to become interested not only in the events themselves, but also in their underlying causes and the ultimate effects of their occurrence.

Industrial health is not solely the concern of medical men interested in industrial medicine and traumatic surgery; it is also the concern of management and labor as well. We have been repeatedly informed that labor comprises approximately one-third of the entire nation,—49,000,000 workers, and that another third is dependent on it. The American workers are the bone and sinew of American life, and to a great extent, their welfare is an indication of our national progress. How did labor fare with reference to health in the preceding year?

The official report of the Bureau of Labor for 1939 with reference to injuries, disabilities and deaths in industry in the United States reads like the score of a modern war! Yet our country was at peace; not a single enemy plane flew over its shores! Here is part of the record: 18,000 workers met death; 106,000 workers sustained permanent injuries, crippling them for life, and causing them to lose many days from work; 1,407,000 workers sustained temporary total disabilities, causing them to lose countless days from work. Of the total deaths, 1800, or 10%, are accounted for by the mining industries. With five major mine catastrophies the first 11 months of 1940, the figure for this year will undoubtedly be much higher. Of course, the Neely-Keller Bill, No. 2420, which provides for Federal mine inspection and which has thus far been scuttled by the lawmakers, might have prevented this useless industrial slaughter. Manufacturing industries claimed 3,000 lives; railroads and transportation, 1600; agriculture, the least protected industry, showed 4300 deaths; 13,000 permanent injuries, and 240,000 temporary total disabilities; construction industries showed 3200 killed; the wholesale, retail, hotel and restaurant industries accounted for 1800 deaths.[1] There is more sickness, a greater number of deaths, more misery and suffering among our industrial population than among any other class of people, regardless of the cause.

Slums breed tuberculosis and delinquency, and sociologists tell us that one out of five or six boy-residents become delinquent each year.[2] We all know that unemployment leads to prostitution and to the spread of venereal diseases; undernourishment cripples children and adults alike.[3] So long as such conditions exist, the most wonderful health program in the world will not eradicate disease.

The recent article of Dr. W. H. Sebrell, of the U. S. Public Health Service,[4] ought to jolt us out of our naive complacency. It gives us a true and accurate picture of the exact state of health affairs in and out of industry in our nation. Here in black and white, official figures indicate that in the United States, the most prosperous and richest country in the world, approximately 4,000 Americans die yearly as a result of pellagra, rickets, scurvy, tetany, beri-beri, and osteomalacia. Setting aside medical terminology for the moment, it means that these people *starve* to death.[5] Now, nutritional deficiencies are important contributing factors in the cases of countless persons who are reported as dying from other causes, such as tuberculosis, for instance, which claims 65,000 victims yearly. And tuberculosis is essentially a disease of poverty, and is most prevalent among workers, particularly those in the low-income group brackets, who lose more days from work due to illness or accidents.

Harriet Elliott, Consumer's Commissioner, of the National Advisory Defense Commission, not long ago reported that there are approximately 45,000,000 Americans living below the American standard of living,—in fact below the safety level, because they were unable to earn enough to purchase the necessary food. "There are 50,000,000 Americans today whose total weekly income is less than $20.00. Sickness and disability strike hardest and most frequently among these families. Poverty, or at least the deficiencies in environment associated with poverty, are directly related to the incidence of certain diseases, subnormal conditions, as well as frequency of injury at the place of employment."[6] The health of the people of our nation is linked with all other factors of modern life. The Emergency Defense program is an added factor. According to Dr. Kingsley Roberts, Director of the

Medical Administration Service in Washington, D. C., "There are 400,000,000 man-days of work lost to industry every year in this country. Only 10% of this total is due to industrial illness. This leaves an appalling total of 360,000,000 days lost through non-industrial illness."[7]

According to Adjutant General Edgar C. Erickson, State Director of Selective Service in Massachusetts, "Malnutrition causes one-third of the State's Draft Rejections. Out of 1,000,000 draft registrants who have been given physical examinations, 380,000 have been found unfit for general military service. One-third of these rejections are directly attributed to nutritional deficiencies. This is a condition that is dangerous, and it calls for concerted, vigorous and immediate action."[8] Total health, our first line of national defense, lies in the strength and vitality of our people.

When wages are insufficient to purchase food, shelter, and the ordinary necessities of life, health is invariably affected, and the effects of industry and occupation on individuals and on groups are also of fundamental consequences. No wonder an outstanding labor leader recently proclaimed over a nation-wide radio hookup that "there were 52,000,000 shrunken bellies in these United States." Now, hungry people, ill people, undernourished people, do not stand for a strong national defense or sound national health. They stand for chronic illness, incapacity of productive labor and inefficiency in industry and in our national economy.

CONFRONTING the doctor in industry as well as the entire medical profession, are numerous problems which have arisen out of and because an alarming number of our population are still unemployed, ill-fed, ill-clothed, poorly-housed, and have no means of proper recreation. This health problem has its etiology in our social and economic life. This indigent citizenry comes primarily from the ranks of the wage-earning group,—"that group which both produces and consumes, and in which the balance between production and consumption is largely maintained."[9]

It is quite obvious that medicine as well as industry shares a responsibility for the ill-health which directly or indirectly affects and diminishes the efficiency, and therefore the earning capacity, of our workers. As physicians it is our duty to determine the causes of illness, and endeavor to restore health. Our approach to this problem is two-fold, medical and socio-economic. Emphasis must be made upon prevention and towards the advancement of control of disease. The contribution to this phase of medical service to industry and to society, "must constitute a record of those principles, the scientific application of which should truly result in man's redemption of man."[10]

To rebuild human society not only on an economic basis, but also mould the human race on scientific principles, should be the sincere desire of all physicians. The concept and procedure of preventive medicine must not be directed chiefly toward the abatement of nuisances; the removal of filth; the isolation and the quarantine of the sick; the disinfecting and the removal of toxic materials and obnoxious gases; of plant hygienic supervision, or of pre-employment examinations. It must include the greater perspective in the prevention and cure of disease,—the social and economic aspects of human beings such as personal hygiene, housing, nutrition and recreation; the promotion of individual and community health; the factors which attain the best results in the treatment of patients and disease, and the significance in the economy of life as a whole, which automatically includes industry.

It is the destiny of man that he has to work in order to maintain life. He must produce and gather the food his organism requires; he must also create materials and conditions to protect himself and his family. Man does not live alone. Men live in groups, and the forms of these social communities, the conditions under which production takes place, represent the reactions of man's mind to the productive forces. "The mode of production of the material means of life determines the general social, political, and intellectual processes of life. It is not the consciousness of human beings that determines their existence, but conversely, it is their social existence that determines their consciousness."[11]

Environment has always been one of the etiological factors emphasized in analyzing and determining disorders of human ailments, as it affects the individual himself, his relation to his family and to the community. "It makes little difference whether or not a man spends most of his time and life at a factory in an urban community, or at home in a rural community; the environment he is in has a tremendous influence in a greater or lesser degree on his physical being and his mental state of health."[12] Attitudes toward disease and health have changed during history. The ancient Greeks, for example, had only scorn for the sick person. Illness was a sign of weakness, while good health was a sign of strength,—a view entirely consistent with the slave economy then in force. Christianity, however, with its glorification of suffering as a means of salvation, made of illness a virtue. So, sickness became desirable; this tended toward a do-nothing policy at first, it eventually led to a sense of responsibility on the part of society toward sick people. In the Renaissance a trend toward realism became evident, but it was not until the industrial revolution of the early 19th century that the concept of disease as a natural phenomenon was established, and the responsibility of society towards the alleviation of disease and the maintenance of good health of the people became widely accepted. The 19th century public health movement started in England only because both the industrial revolution and its evil effects on health were felt there first. Similar movements occurred in France and Germany, riding along with the wave that led to the Revolution of 1848. The German movement was led by liberal physicians most prominent of whom was Rudolph Virchow, the great pathologist. He argued that "medicine is a social science, and politics is nothing else but medicine on a large scale." A broad German National Health Program was envisioned, but came to naught because of the collapse of the revolution and the ensuing reaction. This health movement failed because it was a movement chiefly of liberal middle-class physicians *for* the people but *without* the people. They had no voice in all these deliberations . . . the war against disease and for health cannot be fought by physicians alone. It must include the people as well.

HEALTH conditions in industry have greatly improved in recent years, due to a number of factors; nevertheless, conditions still exist within the confines of industry which are not conducive to the health of the worker, and which are really hazardous to society as a whole. Many industrialists, particularly the small manufacturing plants and small sweat shops, still regard the physical well-being of their workers as of secondary importance.

The rules which govern the economic life of our

nation apply also to the doctor. Today, medicine is a service, a commodity if you please, which is purchased under the competitive system. The physician as well as the worker is exploited to the limit in this scheme of affairs. This is more true of the physician in industry than in other branches of medicine. Doctors have always given and are now giving their services and even drugs to indigent sick with very little remuneration or none at all, so much so, that many doctors have become indigent themselves. Doctors do not readily admit the fact that medicine follows the lines of trade . . . "We still talk as if medicine were a mission fulfilled by physicians from humanitarian motives. As physicians we try very hard not to be dragged into the economic sphere of life, but as human beings our efforts in this respect are all in vain."[13]

Charity, in whatever form, proves to be unreliable, unworthy, and unsatisfactory a system for protecting the people's health. Funds are always needed for this purpose and during times of economic depressions such funds are not readily attainable or forthcoming. It is degrading for free citizens to be the recipients of charity. Americans do not want charity! At no time is it possible for charity to provide proper and adequate medical care. The people's health cannot be protected efficiently and effectively under purely commercial systems of medical care.

There is little value in discovering a worker handicapped by varicose veins, bad tonsils, hemorrhoids, or suffering from syphilis or a disabling dermatitis, when there are no definite adequate means to correct these conditions. Clearly it is useless to find a worker suffering from silicosis or tuberculosis, or lead poisoning and allow him to continue in blissful ignorance to his grave. What benefit is to be derived from telling a worker he has bad teeth, a peptic ulcer, or a thyroid deficiency, if there are no means provided to treat these conditions and sustain the patient and his dependents while treatment is being instituted?

Can anyone logically deny the fact that numerous transformations are taking place in our social order which are now accepted as the necessary order of the march of progress, and which directly affect us both as citizens and as physicians, particularly as these changes pertain to the question of health? Society has undergone a profound change in the last hundred years. We live in a highly industrialized and specialized society. Medical science has also become highly specialized and highly technical. It has progressed more in the last 50 years than ever before in history. "Industry has adopted methods of mass production . . . enormous quantities of raw materials are needed to feed the machine and new foreign markets to absorb the products. The result is Imperialism and wars . . . Millions of people are killed; other millions die of starvation and pestilence . . . War is a social disease like poverty or crime . . . Does that concern the physician? We have not yet learned to approach the basic problems of social life,—production, distribution, and consumption, — scientifically. If a physician believes in his work he cannot but abhor war, which is the negation of all his efforts. When war comes he will of course do his very best to alleviate the suffering that stupidity, inefficiency and greed have brought upon his fellow men. The physician, however, has still another task,—namely to side passionately with life against death; to fight the obvious causes of war, and to help in paving the way for a better world."[14]

Science, technology, political and social advancement are the driving forces that transformed both society and medicine. It is obvious therefore, that a new medicine in a new society calls for new forms of medical knowledge and education, and of new forms of medical practice and service. It means that there must be full health protection without exception for all people. It means that health protection must cover all forms of disability, illness, injury, invalidism, maternity, widowhood, and old age. It means there must be proper provisions for hospitalization and sanitoria care; proper provision for adequate medical follow-up. It means proper provisions and procedures for adequate post-graduate medical training. It means the stamping out of tuberculosis, syphilis, and all other forms of medical and social diseases. In short, it means a reorientation and rejuvenation of medicine and medical thought. Society demands and expects of the medical profession a more ardent interest in promotion of the health and safety of our industrial workers as well as society as a whole, because the factors which govern our social and economic health are profoundly related to our physical and mental health. The history of medicine shows that it is a struggle for human and social welfare.

IN conclusion, the success of an *American* National Defense and Health Program, and as it relates to the physician in industry, is dependent upon:

1. A proper and correct orientation and understanding of industrial medicine by the medical profession, particularly as it pertains to the socio-economic, politico-economic, and medicolegal phases.
2. Education, training, experience and practice in the field of industrial medicine and traumatic surgery.
3. A comprehensive armamentarium.
4. A study and knowledge of the philosophy and psychology of the industrially injured.
5. A comprehensive study and understanding of compensation and other labor laws, and a profound orientation and sympathetic understanding of the history of the labor movement in general and as it relates to industrial medicine.
6. Finally, the most important prerequisite for the success of an adequate *American* National Defense and Health Program is *unity of purpose and unity of action of all the American people,* including the physician in industry. But this is attainable and workable only in so far as the terms of this unity express and embrace the most profound aims and ambitions, the most profound desires and convictions, and last but not least, the most profound *needs* of the majority of our American people.

From an industrial point of view, without these there can be no adequate *American* National Defense or Health Program.

Bibliography

1. U. S. Dept. of Labor, Bulletin 625. Bureau Labor Statistics, 1939.
2. SHAW, CLIFFORD R., Research Director Chicago Slum Area Project, and CAHN, BERTRAM J., President Chicago Crime Commission: Children of Crime Worse than Tuberculosis, *Chicago Times,* October 10, 1938. PISULA, CECILIA: Behaviour Problems of Children from High and Low Socio-economic Groups, *J. Mental Hyg.,* 21:452, July, 1937. HORWOOD, M. P.: Housing and Health, *Commonhealth,* 25:95, April, May and June, 1938.
3. McLESTER, J. S.: The More Abundant Diet, *J. Am. Diet Assoc.,* 14, January, 1938. LANGDON-BROWN, WYMAN: Diet and the National Health, *J. Roy. Inst. Pub. Health & Hyg.,* 1:259, February, 1938.
4. In the September 7, 1940, issue of *J.A.M.A.*
5. SEBRELL, W. H.: Nutritional Diseases in the United States, *J.A.M.A.,* 851-54, September 7, 1940.
6. National Health Program Statistics, 1938, Washington, D. C. REID, W. J. S., and MACKINTOSH, JEAN M.: The Influence of Anemia and Poor Social Circumstances during Pregnancy on Subsequent History of Mother and Child, *Lancet,* 2, 1318, December, 1937. Editorial: Non-medical Factors Affecting Health, *J.A.M.A.,* October, 1938.
7. ROBERTS, KINGSLEY: Waste Due to Sickness. Address at National Conference Social Work, Atlantic City, N. J., June 7, 1941.
8. ERICKSON, ADJUTANT GENERAL EDGAR C.: Malnutrition Causes One-third of State's Draft Rejections. *Boston J.,* June 3, 1941.

9. LAZENBY, A. D.: The Physician in Industry. *Industrial Medicine*, September, 1938.
10. LEATHERS, U. S.: Preventive Medicine, its Outline. *J.A.M.A.*, 1517, October 22, 1938.
11. MARX, KARL: Das Kapital, Three Vols. Internat. Library, N. Y.
12. DORN, H. F.: The Relative Amount of Ill Health in Rural and Urban Communities. *J. Pub. Health Reports*, 53:1181, July 15, 1938.
13. SIEGEREST, HENRY E.: Socialized Medicine. W. W. Norton and Co., N. Y., 1938.
14. SIEGEREST, HENRY E.: Medicine and Human Welfare. Yale University Press, 1941.

Nerve and Tendon Injuries of the Hand

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THE repair of nerve and tendon injuries of the hand makes up a large share of the traumatic surgery of the upper extremity and of the plastic rehabilitation necessitated by injury and infection. Consequently it becomes necessary, in discussing nerve and tendon repair, to touch upon many other aspects of surgery of the hand not having to do directly with the actual repair of nerves and tendons. A consideration of nerve and tendon repair begins with the principles of the management of open wounds in general, with their first aid, diagnosis and definitive care. It entails some discussion of skin grafting and arthroplasty and physical therapy. Above all it necessitates some thought being given to wound healing and those factors which favor or interfere with the process. Lastly it requires emphasis being placed upon operative technique, upon the gentle handling of tissues, upon accurate hemostasis, upon tissue protection from mechanical and chemical trauma, upon rigid asepsis and details of postoperative care.

Many men have contributed to this field of surgery and any one man's ideas must be affected by those of others. Marble, in a recent paper in which he reviewed recent advances in the surgery of trauma, stated that "it is not so necessary to describe new developments as it is to restate old surgical principles and realign them in the order of their importance." The building up of an approach and the development of the surgery of nerves and tendons have come as the result of the labors of many men over the course of many years. If direct acknowledgment cannot be made, the debt is nevertheless gratefully acknowledged. My particular and immediate indebtedness is to the late Allen B. Kanavel and to Sumner L. Koch. Illustrative cases come from the service of Dr. Sumner L. Koch, Dr. Harvey S. Allen, and myself at Passavant Memorial Hospital, Chicago.

We may divide a discussion of nerve and tendon repair of the hand into two large phases, first the immediate repair, and second, the later or secondary repair.

Primary Nerve and Tendon Repair

THE possibility of performing primary nerve and tendon repair of the hand is predicated largely upon three factors. One of these is *time*, the second is the nature of wound *contamination* and the third is *adequate facility* for performing repair. The element of time, so stressed in the surgery of trauma, is that interval which elapses between the time of wounding and the time when definitive care is administered. It is a measure of the interval required for accidentally introduced bacteria to become established within the tissues. As a rule a period of six to eight hours is taken as the limits during which a wound may be looked upon as simply contaminated and amenable to adequate cleansing and excision. After this period has passed, the wound must be looked upon as already invaded, and cleansing and excision must be replaced by measures which favor drainage. In the early stage wounds properly prepared may be closed by primary suture; after the safe period has passed closure is extremely hazardous.

In the case of nerve and tendon repair the time limits are even more restricted than those for primary closure. For whereas a wound may usually be closed up to six or eight hours after injury, and in certain instances even 12 hours or in case of facial wounds, 18 to 20 hours, nerve repair is seldom advisable after eight hours, and tendon repair after four hours. In the case of the flexor tendons on the fingers, enclosed within a dense osteofibrous canal primary repair is not advisable if more than two hours has elapsed since the wound was received. These brief time limits have been established by clinical, often bitter, experience, and it is my feeling they should never be overstepped. Whether or not the local implantation of sulphonamide drugs into wounds will permit a lengthening of the time interval for tendon repair, I do not know. Experimental work now being undertaken by Dr. Harvey Allen and myself seems to show that such implantation prolongs and increases the exudative phase of repair of tendons. Later the repair seems to proceed fairly satisfactorily, but the site of union is more bulky than that without sulphonamide drugs. The time limits which we have established clinically have been gained after disheartening disappointments and cannot be given up without very definite proof to the contrary.

The elements of time would also make the surgeon consider very carefully any operative procedure he might be tempted to undertake in the office or emergency room where facilities for adequate repair are not available. Much valuable time may be lost if a simple laceration be found to conceal serious nerve and tendon injury which the surgeon is not prepared to handle.

The nature of the possible wound contaminants is of great importance in making the decision to perform primary suture. It has been pretty well shown that the organisms leading to the most severe wound infections (exclusive, of course, of tetanus and gas forming anerobes) are introduced into wounds *after* rather than possibly *at* the time of injury. Bacteria introduced at the time of injury from the traumatizing object are rarely from human sources, and rarely belong to the B hemolytic or group A hemolytic streptococci or to the coagulase positive staphylococcus aureus, which two organisms are responsible for the bulk of wound infections. Such bacteria are most often introduced into the wound on unsterile dressings, or fingers, or as droplets from nose and throat of any one or more of numerous individuals who examine or treat the wound, or from the dust of wards or dressing rooms in which an infected wound has been dressed. The importance of these human sources of infection is nowhere better illustrated than in wounds received from human teeth, and from instruments contaminated with organisms from human infections. Proof of the introduction of such organisms into wounds during hospital stay has come in abundance from studies of the Medical Research Council of Great Britain.

Such contamination, therefore, must be rigidly guarded against from the time the patient is injured until the injury has healed. First aid as far as the

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open wound is concerned should consist simply in the application of a sterile dressing to prevent the introduction of bacteria into it. Granted the wound is already contaminated by the injuring object, these bacteria, in the vast majority, are either harmless or are only potentially so, after they have accustomed themselves to a new environment. But the organisms which may be blown in from expired air, or carried in on fingers, hankerchiefs or unsterile instruments are vey likely to be virulent and to be immediately invasive.

Following first aid care, the wound should not be exposed until precautions are taken to prevent contamination. Inspection in the emergency room should be done only after the surgeon and all others, including the patient, are properly masked and a sterile set-up has been arranged. If the wound is to be cared for in the emergency room, precautions to prevent wound contamination should be as strict as in the operating room. Virulent bacteria may be introduced into a small wound as well as a large one, and a small focus of contamination may be as serious as an extensive one.

It is partly because of the dangers of serious secondary contamination that I feel it unwise to attempt tendon repair in a wound which has been tampered with in an emergency room or office. Even if nothing more than ligation of bleeders has been done, sad experience has taught me to refrain from nerve and tendon repair in such a case and at times even to consider very seriously the advisability of primary closure.

When the patient with a wound of the hand presents himself the surgeon should ascertain first the exact time when the injury was incurred. Second, he should inquire into the nature of the injury and attempt to ascertain whether the injuring object was contaminated by organisms from human sources. This is likely to occur only in the case of human bites, and then most frequently over the knuckles. Wounds at this location must always be suspected of being human bites until proved otherwise. The surgeon should also know the nature of the first aid care, and the course of the wound from the time of its inception and from this information determine the possible sources of bacterial contaminants.

The need for adequate facilities for repair is nowhere better illustrated than in the case of nerve and tendon injuries. Tendon repair is possible only with the most meticulous of technic, with proper suture material, needles, and instruments, and with sufficient assistants. To attempt it under other than wellnigh perfect conditions is rarely justifiable. It would be preferable under uncertain conditions and unfavorable circumstances simply to close a wound and plan on secondary repair later. Although primary repair has a better prognosis than has secondary repair its advantages are far outweighed by the disadvantages of attempting to perform a secondary suture following an unsuccessful primary one. The loading up of a tendon end with heavy silk or catgut, crushing of it with heavy forceps and irritating it with gauze will lead to such a reaction that secondary repair becomes exceedingly difficult, while if infection has supervened an irreparable situation may obtain.

In brief, therefore, primary tendon repair will depend upon the patient reaching an adequately equipped operating room and competent surgeon within two to four hours, the wound having been adequately protected all the while from secondary contamination and tampering. Should this ideal triad not exist the surgeon cannot be criticized for refusing to attempt primary repair, although of course the patient should be informed at the time.

A few other considerations may render primary tendon suture inadvisable. One of these is the condition of the tissues. In the case of crushing wounds with marked devitalization of tissues, and particularly in such cases where loss of skin necessitates grafting, tendon repair is best deferred until a later date. In the case of compound fractures associated with tendon division, tendon repair is usually not advisable.

Primary nerve repair may usually be performed up to the limits that primary closure is feasible, i. e., six to eight hours. This is probably due to the fact that nerve is more resistant to infection than is tendon, that nerves do not retract and hence may be more easily located in the wound and do not entail searching through undamaged tissues for proximal stumps.

In the preparation of the open wound the surgeon should attempt to remedy two conditions, namely, the contamination and the tissue injury. (Koch—1936; Mason—1937.) Bacteria, foreign bodies and debris accidentally introduced, should be removed from the wound as thoroughly as possible without adding damage to the tissues. The cleansing of the wound is best accomplished by the liberal use of soap and water and copious irrigation with warm normal saline solution. This cleansing does not of course produce a sterile wound; it is doubtful if a wound is ever rendered sterile except by the tissues themselves. However, careful soap and water cleansing, provided the wound can be seen within the "golden period" of six to eight hours may be depended upon to render a wound surgically clean.* In fact, providing the other prerequisites for tendon repair have been met, nerve and tendon repair may be safely undertaken in a wound so cleansed. Washing of the wound begins with a careful cleansing of the surrounding skin, while the wound itself is covered with a dry sterile dressing. Fully 10 minutes is required to produce a surgically clean skin. Then with a separate sterile set-up and fresh sterile gloves, the wound itself is washed with soap and water and finally copiously irrigated with warm sterile saline solution. This procedure likewise requires 10, often 15 or 20, minutes and the part is draped for the excision. The use of antiseptics in an attempt to sterilize a wound, far from cleansing it and rendering it sterile, damages the tissues and lowers their resistance to whatever bacteria still remain and predisposes rather than discourages the development of infection (Reid—1936). It is hazardous to attempt tendon repair in a wound in which antiseptics have been poured.

After the wound has been thoroughly cleansed and irrigated the next step consists in the excision of tissues whose vitality has been so lowered that they are certain to become necrotic. Devitalized tissues are a serious handicap to wound healing. Necrotic tissue forms an excellent pabulum for bacterial growth

* The efficacy of this manner of mechanical cleansing with soap and water, excision of devitalized tissues and closure, has been convincing to us. Reports from other surgeons also bear this out. In this connection the recent paper by Overton (INDUSTRIAL MEDICINE, June, 1941, pp. 239, 242) is of interest. Robert Lee Kerrigan, of Michigan City, Indiana, in a personal communication in which he notes that compound injuries of the hand amounted to approximately 50% of total injuries, presents figures of 9,866 compound injuries of the hand. Of this group of injuries, infection occurred in 33 cases, an incidence of 0.3%. Of these 33 cases, nine required hospitalization while 24 were trivial affairs which subsided under ambulatory care.

and hence favors infection. Should infection not occur the removal of necrotic tissue from the wound by sloughing or absorption seriously delays repair. The complete excision of a wound, that is removal of the entire wound surface, is a procedure which can seldom be accomplished even in the simplest of injuries and is probably never accomplished in the most extensive. It is my feeling that complete wound excision, except possibly in the most skilled of hands is a highly dangerous procedure, one that sacrifices much viable tissue and that seldom accomplishes the end of producing a clean wound. But granted that it can be done, it is my feeling that it is not necessary. As I see it the essential purpose of wound excision is to remove non-viable tissue, and not primarily to remove contaminants. This latter removal of contaminants may be more easily achieved and at less sacrifice of healthy tissues by adequate soap and water cleansing.

Excision is done with sharp knives, only occasionally with scissors, frequently rinsed in sterile water, and during this time the wound is frequently irrigated with salt solution from a syringe. Excision starts with removal of crushed or otherwise seriously damaged skin. Skin flaps, which, because of separation from blood supply or severe traumatization, are certain to die, should be excised. Fascia and subcutaneous fat and particularly muscle are likewise excised if devitalized. Bone fragments separated from their periosteum or other source of blood supply require removal. Nerves and tendons must of course be visualized during excision and carefully guarded and only the badly traumatized ends excised before suture.

Cleansing and excision are greatly facilitated if the surgeon has a bloodless field in which to work. This may be secured by the use of a blood pressure cuff applied to the arm and pumped up to 260 mm. of Hg. after elevation for 30 seconds. This pressure may be maintained as long as necessary to complete the operation. It is released once during the procedure to permit identification and ligation of bleeders. The cuff is then reinflated and not released until the final pressure dressing has been applied.

Cleansing and excision are the most important steps in the whole procedure in caring for the open wound. Both require time, patience and a conscientious attention to detail. They can seldom be relegated to an intern or assistant until that individual has had opportunity to observe how they should be done.

The whole process of washing and excision accomplished, the wound is ready for deep repair and closure. (Fig. 1.) Nerves and tendons are identified and the surgeon plans methods for suturing them. The blood pressure cuff is released, and gauze pressure is exerted on the wound for a few minutes until the reactive hyperemia ceases. Bleeders are caught and ligated with fine silk, and other oozing controlled by pressure. As soon as satisfactory hemostasis has been secured the arm is again elevated and the pressure reapplied. Nerve and tendon repair is then accomplished, the wound closed and a snug pressure dressing (Fig. 2) applied to the wound before the sphygmomanometer is released.

Repair of tendons is best accomplished with fine silk on fine needles. Accurate apposition of the ends

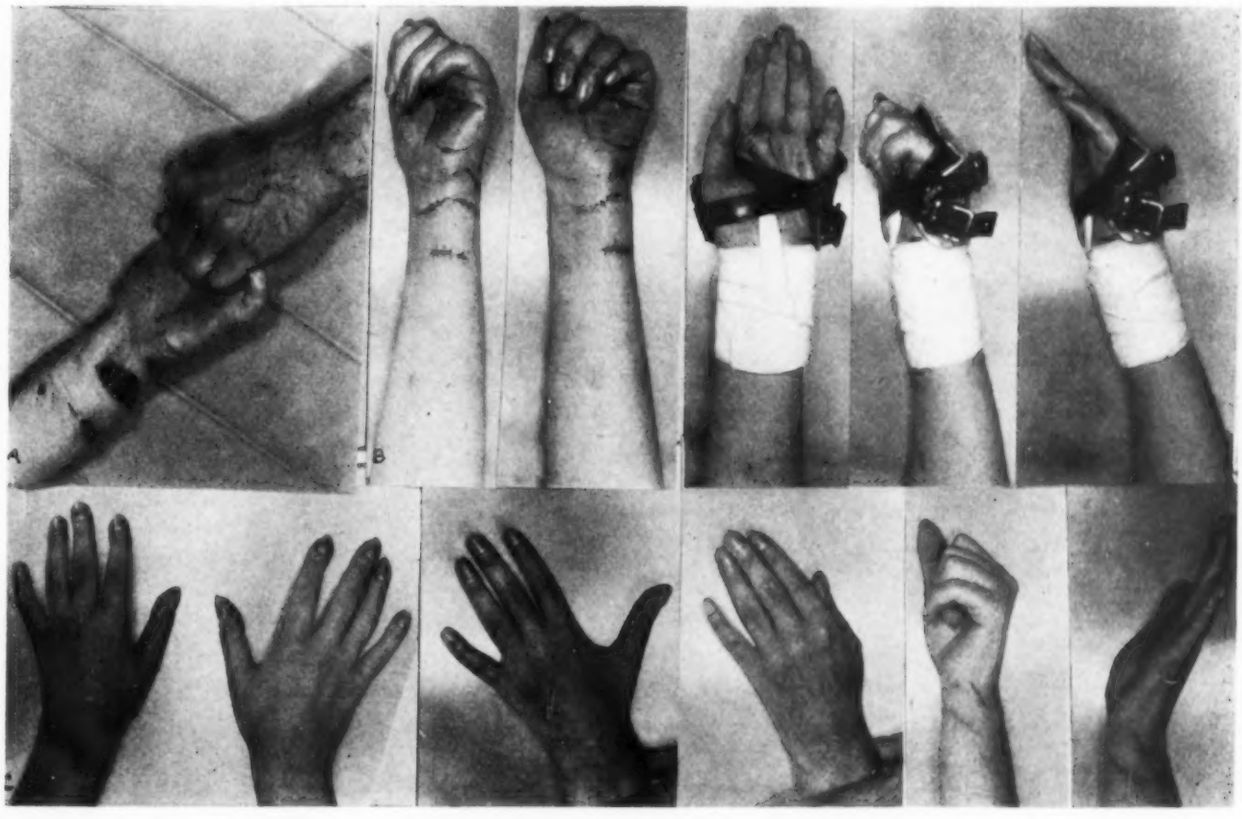
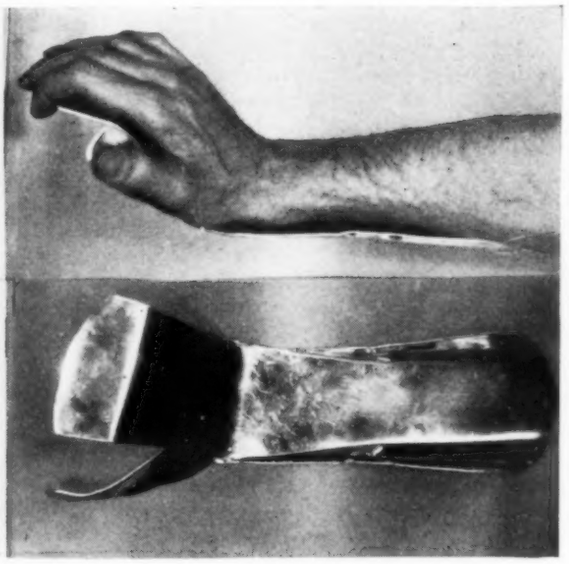


Fig. 1.

Multiple lacerations of left wrist from car window glass cut at 5:30 P.M. First aid consisted in application of sterile dressing. Operation at 9:50 P.M., at which time there was found division of ulnar nerve and flexor carpi radialis tendon. Primary suture of nerve and tendon and closure of wounds. One small wound with skin loss (not over site of nerve and tendon repair) closed with skin graft. (A) Before primary repair. (B) Five weeks after repair showing ulnar atrophy, and the type of splint applied to relax the paralysed interossei and adductor pollicis. (C) Four months after injury, showing returning ulnar nerve function and absence of atrophy.

Fig. 2.
A large resilient pressure dressing is applied to the hand before the sphygmomanometer is released.



Figs. 3 and 4.
(3) Splint as applied to the wrist to maintain flexion as indicated after suture of the median nerve. If flexor tendons have also been repaired the splint should extend beyond the finger tips so as to hold the fingers in slight flexion. (4) Splint applied to volar surface of wrist and hand. Useful after suture of the extensor tendons, in radial paralysis, etc.

should be secured by means of sutures which do not interfere with the circulation of the stumps or disrupt the fibers. Many ingenious methods have been devised to accomplish this. My preference is for a double suture which takes advantage of the fact (Fig. 5) that a pull transverse to the tendon fibers has a mechanical advantage over one which runs longitudinal

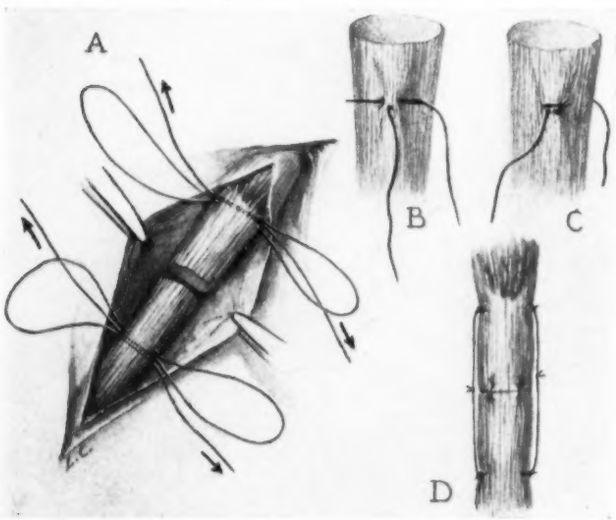


Fig. 5.
Method of tendon repair whereby the tension sutures pull transversely to the tendon fibers. A small bundle of fibers is caught at the side of the tendon about 1 cm. from the divided end. The suture is then passed straight through the tendon to emerge on the opposite side. A second suture is then taken and a small bundle of fibers is caught just below the point of emergence of the first suture, between it and the end of the tendon. The second suture is then passed straight through the tendon and emerges above the knot of the opposite suture and between the fiber bundles which have been caught in it. When each suture is drawn toward the cut end of the tendon, it rides over the knot of the opposite suture as if over a pulley and the longitudinal pull is converted into a transverse one. Accurate approximation of the tendon ends is obtained by a few fine silk sutures which unite the peritendinous tissues at the site of opposition. (From Mason and Allen—Ann. Surg., 1941, 113:424.)

to them. The size of silk to be used is best stated by saying that it should be fine and with a tensile strength not over four and a half to five pounds. For some very fine tendons it need not be this strong. Accurate apposition of the ends can be obtained by use of one or two very fine sutures of 6-0 or 8-0 silk swaged on tiny needles.

Repair of tendon injuries on the fingers presents a special problem in itself, due to the rigid narrow tunnel over the three tendon slips involved. (A method of tendon repair which has proved successful in our hands is illustrated in Figs. 6 and 7.)

Nerve repair follows the usually recognized principles; that is accurate end-to-end apposition by sutures which pass through the sheath only. These sutures of 6-0 or 8-0 silk should be so introduced that the stumps are not rotated. Sutures which perforate the nerve substance cause marked irritation in the nerve and interfere with down growth of axones (Fig 8).

Closure of the wound may be accomplished by simple suture or, if suture cannot be effected without tension, then by skin graft. The use of thin skin grafts, raised with a razor or graft-cutting machine should become a commonplace operative procedure. The removal of small or large grafts requires a little practice, but will repay the surgeon many times over. The ability to perform such emergency grafting gives the surgeon complete control of the wound and removes the temptation to take chances with skin flaps which might die if left in place or sutured under tension.

At times a pedunculated flap is required, but such an indication is quite rare. However, if a flap is necessary and if the surgeon can transfer it successfully it will save months of waiting and may save a hand.

Postoperative splinting for provision of rest for the injured part has been repeatedly emphasized (Koch and Mason—1939). One of the great advantages of the plaster encasement treatment of wounds is that it provides complete immobilization for the extremity. Postoperative splinting is necessary after repair of injuries to the hand not only to provide rest but also to provide relaxation of sutured nerves and tendons. It does not make much difference how the splint is made

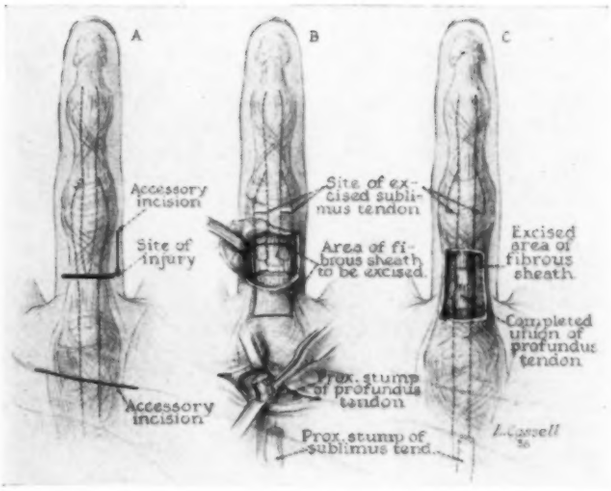


Fig. 6.
With division of both flexor tendons in the finger the profundus tendon only should be sutured. The original wound is enlarged to permit excision of the distal sublimis stumps and to allow sufficient room for tendon suture. The proximal stump of the profundus is picked up through an accessory incision in the palm and led back through tunnel into finger and repair accomplished. A square segment about 1 cm. long is then excised from the fibrous sheath over the site of tendon repair. When the skin is closed this square window is covered by the subcutaneous fat which will permit gliding of the tendon after healing. (Reproduced from Surg., Gynec. & Obst., 1940, 70:392.)

just so it works. (Figs. 3 and 4.) Aluminum has been our choice, but it looks now as if we may have to look about for some other material.

The period of relaxation splinting varies with the tendons involved. Extensor tendons require longer periods of relaxation than the flexors, due probably to the fact that healing in case of extensors seems to occur with a gap and this gap tends to stretch, whereas the flexors are more likely to unite end-to-end and attain firm union at an earlier date. It is our practice to keep flexor tendons splinted continuously for four weeks. At the end of the first two weeks of splinting the patient is encouraged to move his fingers in the splint and after the third week the splint is straightened slightly so as to allow a wider range of motion. After the fourth week the patient is allowed to remove the splint once or twice a day for soaking and use of the hand, and at the end of this week the splint is completely removed during the day but worn for an additional week at night only. In the case of the extensors the program is the same, except it is one week later.

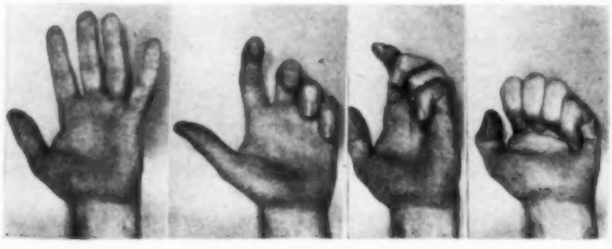


Fig. 7.
Division of flexor tendons and digital nerves to left little finger by oblique cut with broken glass tubing over volar surface of proximal phalanx. Injury took place at 9:00 P.M., operation started at 10:32 P.M. and completed at 11:35 P.M. Photograph shows function 12 months after injury. Method of repair shown in Fig. 4.

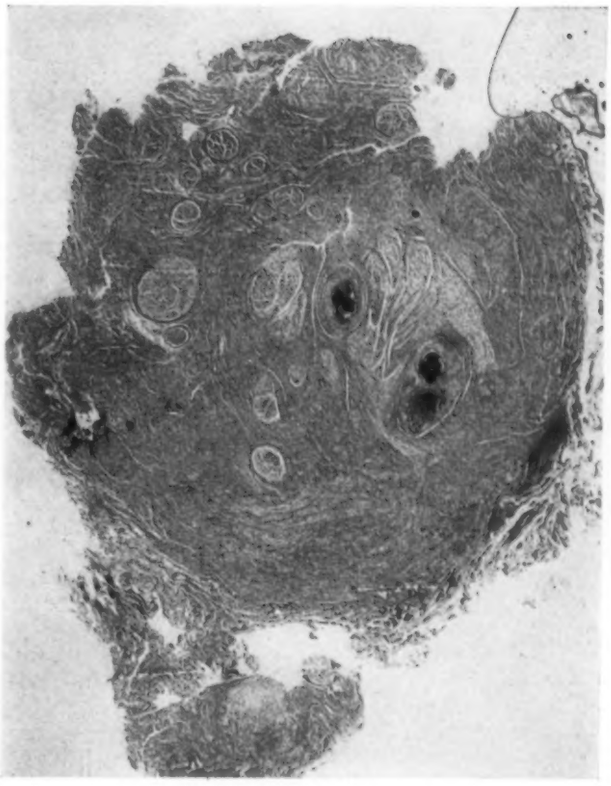


Fig. 8.
Section through a median nerve neuroma which followed suture. Embedded within the neuroma are several pieces of suture material.

It has been possible in a few cases to obtain healing of divided extensor tendons by splinting alone. In these instances the circumstances have been such that the patients have been seen 24 to 48 hours after the injury and an open repair has not been possible and the tendons have been divided in that part of their course where they are surrounded by areolar paratenon and not by synovial sheaths. (Fig. 9.)

Muscles paralyzed by nerve division require to be kept immobilized until such a time as their innervation returns (Fig. 1). This may require splinting for six to eight or even 12 to 18 months and should be accomplished with splints which permit the maximum use of the hand within the limits of motion of the splint.

Fig. 9.
Division of extensor pollicis longus over dorsum of metacarpophalangeal joint. Patient seen 20 hours after injury, too late for primary suture. Wound covered with sterile dressing and hand immobilized on splint with thumb in abduction and extension. At the end of four weeks thumb piece bent forwards slightly to allow slight restricted use, this was increased at end of fifth week, at sixth week splint removed during daytime and worn only at night for one more week. Result eight weeks after injury.

The neurologic surgeon and the orthopedists have long recognized the need for putting paralyzed muscles at rest in relaxation and have stressed the great damage which may occur if they are stretched by the unopposed antagonists. Witness the primary care of poliomyelitis.

Secondary Repair

SECONDARY repair becomes necessary either from failure of primary repair or because primary repair was not possible at the time of injury. Before undertaking secondary nerve and tendon suture several things must be considered. The surgeon should first make an accurate diagnosis of the condition. Inability to move certain joints may simply be due to fibrous ankylosis and not to actual tendon division. Return of sensation to some areas may be due to overlap and not to nerve regeneration. If, after careful examination, serious doubt exists as to nerve return it has been our experience that regeneration is not taking place.

In the main, three considerations govern the judgment in deciding when to perform nerve and tendon repair. These are: The manner in which the original injury healed; the condition of the joints moved by the tendon involved; and the condition of the associated soft tissues. If the original injury healed by

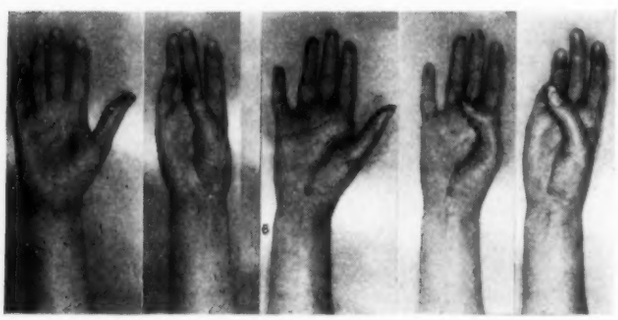


Fig. 10.
Porcelain faucet injury January 18, 1941, of right thenar eminence, dividing flexor pollicis longus and both digital nerves to the thumb. Wound closed elsewhere by suture of skin only and healing by primary intention. April 1, 1941, 10 weeks after injury the wound was reopened and secondary suture of nerves and tendon accomplished, Primary healing. (A) Before secondary operation. (B) Eight weeks after secondary repair.

primary intention without any reaction one can safely reopen the wound within three to six weeks and perform secondary suture (Fig. 10). If, however, there was a moderate tissue reaction with a slight amount of serous discharge, or a small stitch abscess which ceased in a few days without temperature elevation the period of waiting should be longer. Four to eight months seems to be the period which we have usually waited after healing has been complete before attempting repair. If however, the original wound had been seriously infected, the patient had been gravely ill and required long hospitalization and the wound remained open for weeks, then a period of 12 to 18 months should elapse between complete healing and secondary repair.

The joints should be freely movable passively before tendon repair should be attempted. It is hopeless to expect freshly sutured tendons to move joints which cannot be moved passively. It may, therefore, be necessary that time be spent with physical therapy and tension splinting before tendons can be repaired. At times arthroplasty of the metacarpo-phalangeal joints will release the contracted collateral ligaments and permit motion.

Lastly the surgeon must take into account the condition of the soft tissues of the hand, particularly of the skin. The induration of tissues must have subsided. It is often necessary to remove dense cutaneous scars and replace them with pedunculated flaps so that the freshly repaired nerves and tendons do not lie in a scar tissue bed. These flaps should be raised and transferred several months ahead of the time when tendon repair is contemplated so that any associated reaction has had a chance to subside completely.

Resume

THE repair of nerves and tendons in the hand is based upon careful consideration of the wound, the conditions of the tissues and the available facilities. "The successful surgery of traumatic wounds is far more exacting of judgment, skill and time than elective surgery." (Reid and Carter, 1941.) Primary repair of tendons may be undertaken in a wound seen within two to four hours, in which the possibility of human contaminants may be excluded, if the condition of the surrounding tissue permits. In case of doubt, closure of a wound and secondary repair is a safer course. Secondary repair of nerves and tendons may be undertaken within three to eight weeks providing the wound healed without reaction and the tissues are soft and the joints mobile. If infection has supervened a period of four to 18 months must elapse, depending upon the severity of the infection, before secondary repair can be undertaken. Oftentimes joints must be mobilized and cutaneous scars replaced by pedunculated flaps before secondary repair can be done. It cannot be emphasized too strongly that success in nerve and tendon repair depends upon a surgeon's ability to work carefully and atraumatically, to handle tissues gently, and to avoid trauma as carefully as he avoids sepsis.

References

KERRIGAN, R. L.: Michigan City, Indiana, Personal Communication.
KOCH, S. L.: Injuries of the Hand. *J.A.M.A.*, 1936, 107:1044-1049.
KOCH, S. L., and MASON, M. L.: Purposeful Splinting Following Injuries of the Hand. *Surg., Gynec. & Obst.*, 1939, 68:1-16.
KOCH, S. L.: Some Surgical Principles in the Repair of Divided Nerves and Tendons. *Quart. Bull. Northwestern Univ. Med. School*, 1940, 14:1-7.
MARBLE, H. C.: Traumatic Surgery. *New Eng. J. Med.*, 1939, 221: 860-862.
MASON, M. L.: The Surgical Principles involved in the Treatment of Open Injuries. *Western J. Surg., Obst. & Gynec.*, 1937, 45:239-248.
MASON, M. L.: Primary and Secondary Tendon Sutures. *Surg., Gynec. & Obst.*, 1940, 70:392-402.
OVERTON, L. M.: The Primary Care of Traumatic Wounds. *Indust. Med.*, June, 1941, 10:239-242.
REID, M. R.: Some Considerations of the Problems of Wound Healing. *New England J. Med.*, 1936, 215:753-766.
REID, M. R., and CARTER, B. N.: The Treatment of Fresh Traumatic Wounds. *Ann. Surg.*, 1941, 114:4-18.

Sulfathiazole Locally

—*In the Treatment of Acute Traumatic Wounds*—

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WHILE the literature relative to the local application of the sulfa derivatives is quite voluminous, particularly since the bombing casualties of Britain, it is difficult to arrive at a definite conclusion as to the possible value of this mode of treatment unless a large series of treated and untreated cases are studied statistically. The cases we report here present this

Sulfathiazole powder and ointment supplied through the courtesy of the Winthrop Chemical Company, Inc., Dept. of Medical Research, 1004 Candler Building, Atlanta, Georgia.

problem, and it is with considerable reservation that we record our preliminary impressions based upon six months' observation.

Jensen[1] reports that all compound fractures treated at the Minneapolis General Hospital since March, 1938, have been treated with sulfanilamide into the wound following debridement, routine skin closures with clips, and fracture immobilization. In analyzing 75 such treated fractures he records only four (5.3%) cases infected. Two of the wounds that became infected were so extensive that an effective skin closure could not be accomplished. The third patient had a recurrence of his compound fracture eight days following the original injury. The fourth infection occurred in association with internal fixation. Throughout the whole series there was no evidence of gas gangrene or tetanus. When this series is compared with similar cases treated in previous years, the advantage of sulfanilamide therapy is quite obvious since in 1937 alone five patients developed gas gangrene. Likewise, it has been necessary to perform several amputations each year because of infection.

The infection rate for untreated cases during the last five years ranged from 26 to 30%.

In view of the fact that it has been shown experimentally in animals that an equal amount of sulfanilamide placed directly into a contaminated wound is much more effective than when given parenterally at a different site, there seems to be a very logical reason for clinical application.

There is also evidence indicating that certain products of tissue disintegration, such as para-aminobenzoic acid, which are quite necessary for bacteria propagation, are also sulfa compound inhibitors. Likewise, it is quite possible that sulfa derivatives, which in a very broad sense resemble para-aminobenzoic acid structurally, may in some peculiar manner prevent the utilization of the nutrient substance and thereby result in cessation of cell division. Such an action might be referred to as bacteriostasis.

In considering the subject Lockwood[2] states that the principal factors which will tend to nullify the magnitude of the curative effect of sulfa derivatives are: (1) concentration of the drug maintained in the immediate environment of the bacteria, (2) mobilization of cellular defense, and (3) concentration of the so-called sulfa inhibitors. The local application of sulfanilamide and its analogues seems to fulfill two of these three prerequisites quite satisfactorily. Certainly the instillation of the drug into the wound satisfies the first recommendation and at the same time the ratio between the therapeutic agent and the sulfa inhibitor is basically in the patient's favor.

Pulaski, Meleney, and Spaeth[3] have shown by careful study that accidental wounds are always found to be contaminated. In reporting their observations on 200 fresh traumatic wounds, it is stated that contamination usually occurs with pathogenic and often virulent organisms. With respect to "clean" and "dirty" wounds it is difficult to tell which one will develop infection. The important bacteriological findings in 200 cases were: Staphylococcus aureus, 104 times, 52%; hemolytic streptococcus, 34 times, 17%; nonhemolytic streptococcus, 53 times, 26.5%; green streptococcus, 18 times, 9%; clostridia, 46 times, 23%; enterobacteria, 46 times, 23%; and the anerobic gram negative bacilli, three times, 1.5%.

These data based on the bacterial flora give sound basis for the prophylactic treatment of any potentially infected wound. It has been our experience that when the wound is seen immediately we have been able to allay infection by the local application of sulfathiazole after the usual preliminary treatment. On the other hand should local areas of tissue necrosis develop as the result of neglect, there is some slight resistance to sulfa therapy, probably because of the increased amount of sulfa inhibitor present. It is in such resistant lesions that surgery should be resorted to at once.

In considering the report of Pulaski *et al*, heretofore mentioned, wherein it is indicated that staphylococci are the predominating organisms, there seems to be little question as to the selection of sulfathiazole as the compound of choice. Although we do not have data available showing the concentration of sulfathiazole in the wound we are inclined to believe that it must approach the saturation point and remain so for several days in the tissue fluids. The material we have employed is sterile sulfathiazole (powder) supplied in rubber stoppered vials containing one gram each. For minor injuries, as burns and abrasions, and in some instances as a dressing, we have found a 25% ointment of sulfathiazole in a special base quite valuable.

The cases treated in this series are those which were potentially infected and comparable to those which have given us considerable difficulty in the past. They are traumatic amputations, cut tendons, compound fractures, severe lacerations, and foreign bodies. In addition we have treated a small series of second- and third-degree burns.

Recognizing that the evaluation of this or any other mode of therapy applicable to industrial surgery is not without difficulty we list below results obtained in the series of treated cases as compared with the end result in a control group:

Injury	No.	Cases	Total Visits	Av. No. Visits	Total Days	Av. No. Days
Traumatic Amp.	Treated	8	132	16.5	341	42.62
	Control	14	271	19.35	577	41.21
Cut Tendons	Treated	14	149	10.64	359	25.64
	Control	20	410	20.5	938	47.4
Lacerations (deep)	Treated	36	255	7.08	524	14.55
	Control	51	763	14.96	1789	35.07
Compound Fracture	Treated	8	88	11	228	28.5
	Control	5	51	10.2	152	30.4
Foreign Bodies	Treated	8	45	5.62	96	12
	Control	3	35	11.66	64	21.33
Average	Treated			10.16		24.66
	Control			15.33		35.12

With reference to the series of traumatic amputations we desire to point out that the rather high figure for average visits in the treatment group is due to the fact that one individual was treated with 1% sulfathiazole ointment for the first 15 days. This proved to be inadequate to prevent and control his infection and resulted in prolonging his treatment period to 86 days. If this case were deleted from the series we would have an average of 36.42 days observation during which time an average of 16.5 treatments were given. These figures are quite significant when compared with an average of 41.21 days observation and 19.35 treatments per patient in the untreated group.

Both the control and sulfathiazole groups received routine prophylactic and treatment measures, that is, wound cleansing, debridement, suturing and fixation when indicated. Although our results from sulfathiazole are indeed encouraging we do not have the temerity to suggest the discarding of the routine heretofore followed. Our good results in the treated group appear to be additive and would suggest that the procedures followed complement each other. Aside from the real issue it is interesting to note that many patients volunteered the information that they experienced a mild degree of local anesthesia following the application of sulfathiazole to the denuded surface.

Bibliography

1. JENSEN *et al: Surgery*, 6:1 July, 1939.
2. LOCKWOOD, *Surg., Gynec. & Obst.*, Vol. 72, February, 1941.
3. PULASKI *et al, Surg., Gynec. & Obst.*, Vol. 72, July, 1941.

The Worker's Welfare

—What One Plant Is Doing About It—

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Director of the Professional Department,
Bristol-Myers Company

MAINTENANCE of the health and morale of workers at their highest levels will do much to help our country during the present emergency. The devices and means utilized by Bristol-Myers Company at its plant in Hillside, New Jersey, are typical of the most modern trend in keeping employees happier and healthier as they go about their daily tasks.

Until recently, conditioning systems that filtered air and cooled it with water or refrigeration were the best that science could offer in the way of purifying the air indoors. We have had such units for many years, but last summer we installed ultra-violet lamps in our air conditioning system. As the ultra-violet lamp is effectively bactericidal, the combination of lamp and air conditioning permits our employees in the departments of manufacturing, finishing, and packaging where it is located to breathe in an atmosphere which is not only free of dust but almost 100% sterile. The ultra-violet rays, given off by a battery of 104 lamps, are invisible and of a special wave length known to be most deadly to bacteria. The tubes, 30 inches long, shoot lethal rays through 40,000 cubic feet of circulating air per minute.*

According to William M. Bristol, Jr., Vice-President in Charge of Production, this is the first large scale application in the United States of ultra-violet light to air conditioning in a manufacturing plant, producing what is probably close to the purest air in the world. The regiment of lamps, which stands guard in a specially built portion of the air conditioning duct, beyond creating a better working atmosphere for the men and women in the plant, also helps protect the products being manufactured—tooth paste, saline compound, toilet articles, etc.—against contamination.

The idea for installation of the ultra-violet lamps came to us from reports on their germ-killing ability when used in hospital operating rooms. Despite careful watch on the health of employees, despite the fact that employees with colds or other ailments are sent home (on full pay until recovery), certain individuals did contract colds and other illnesses. In an attempt to minimize the incidence and severity of these ailments (and incidentally raise the quality of manufactured products) the Sterilamps were installed. Actual tests show that fewer than one bacterium per cubic foot is present in the ultra-violeted and conditioned air, and this one is almost always harmless. Before use of the lamps the air averaged 103 organisms per cubic foot.

There has been definite evidence that operators in that large department have been free from colds and other respiratory ailments. Naturally, there has been less absenteeism.

ANOTHER effective method used in the Bristol-Myers plant to help reduce fatigue is a recently installed sound system. This broadcasts radio and recorded music, other entertainment and significant news programs throughout the various buildings for a total of four hours out of each working day. The hours are from 8:30 A.M. to 9:30 A.M.; 11:30 A.M. through lunch time to 1:30 P.M.; and from 3:00 to 4:00 in the afternoon. One of the largest industrial sound systems in the east, it operates in the manner of a miniature radio network.

The telephone operator at her switchboard manipulates the system through a master control cabinet equipped with a four-band radio receiver which permits feeding of radio programs directly into the loudspeaker circuits. For the broadcasts of recorded music the equipment consists of an automatic record player which provides 25 minutes of musical selections with a single loading. The immediate practical reason for such a system, of course, is the aid it gives us in finding busy executives and other key men promptly when they are away from their customary stations, but the additional uses we expect of the system may prove fully as great in value. It will be an aid in enabling plant and office workers to go through a day with a minimum of fatigue and a good day's work.

In this ultra-modern sound system, manufacturing noises are masked by a music level giving a pleasing blanket effect. Technically stated, sound feeds from the microphones, from the radio set, and from records through an amplifying system located in the basement of the office building before going out on cables to the loudspeakers of all departments. The former paging system, where bells rang almost continuously, has certainly been improved upon.

Installation of the new paging system is considered an engineering joy by R.C.A., inasmuch as it results from a study of manufacturing operations in our plant, where, on various floors and in different departments, the noise levels vary in intensity and in frequency. The total volume of sound generated in the system is equivalent to the needs of three average theatres or one large outside stadium. Individual loudspeakers, however, can be kept at desired modulation. There are 165 loudspeakers, assuring that messages will reach every corner of the building.

In case of emergency, fire for example, the system allows instant communication with any single department, with a segment of a plant, or with the entire manufacturing area. Safety speeches by the plant executives, as well as other company announcements, can be broadcast to all employees at their stations.

STILL other ways of saving wear and tear on employees, helping to boost health and morale, are practiced in our laboratories. The company provides for a general physical examination (which includes a Wassermann test) for all newly hired employees. A free annual medical examination by the company doctor is offered and all employees are encouraged to make use of this. A registered nurse is on duty during working hours in the company emergency hospital, with the doctor available upon call. All accidents, even a slight scratch, are attended to immediately.

Noise in factory operations has always been a disconcerting and disagreeable factor pertaining to health and peace of mind of employees, and recognizing this fact, much of the machinery of the Bristol-Myers Company has been enclosed. Sound-proofing tile also has been used and these together greatly reduce operating noises in the plant. Work of this kind is carried on continuously, and it is felt that the reducing of noise adds not only to the better comfort, but also to the better efficiency of the employees.

Vitally interested in the safety of employees, the company has a plant safety committee and depart-

*Sterilamps, developed in the laboratories of the Westinghouse Lamp Division, Westinghouse Electric & Manufacturing Company, Bloomfield, New Jersey.

Nurse in Attendance

mental safety committees. The machinery is well protected with safety guards, and employees receive sound instructions in safety measures and practices.

ANOTHER factor that contributes greatly to the good health and peace of mind is a new club-house recently built for the exclusive use of our employees. The club-house is a two-story modern air-conditioned building. On the lower floor is located a well-equipped cafeteria which is operated by the Bristol-Myers Association. Any profits resulting from this operation are kept by the Association and added to the social fund. In this cafeteria the meals are most inexpensive, yet of the highest standard and are arranged by a nutritional expert.

On the upper floor of the club-house is an auditorium capable of seating comfortably over a thousand persons. This auditorium is fully equipped with stage, including curtains, scenery, lights, and loudspeakers. Basketball, badminton, hand ball and ping pong equipment is also provided and many matches are held. In addition full gymnasium equipment is installed. It is in this auditorium that the Association holds its dances, amateur theatricals, social, and athletic events, all tending towards better health and good will among the employees.

Bristol-Myers' employees also enjoy such benefits as group life insurance, group sickness and accident insurance, a hospitalization plan available to both employees and their families, an old age pension plan assuring old and faithful employees security in their advanced years. Every one of these advantages tends to improve the health, tranquility, and efficiency of the employees, and the management feels that their cost is fully returned through the dividends in increased efficiency, in addition to the personal satisfaction in aiding the employees who have taken so great a part in making our company a great success.

All in all, the outlook of Bristol-Myers in regard to employee welfare is definitely on the modern, humane, and thoroughly progressive side.

The Sterilamps

IN summarizing I would state that the health, morale, efficiency, and contentment of our employees have been greatly enhanced by these factors above described:

Cafeteria Culinary Department

The installation of ultra-violet lamps to purify the air where many of our employees are at work.

The installation of a sound system for paging, and broadcasting of news and instructions, as well as for musical programs.

A general physical examination before hiring employees.

A physician and nurse, looking after the health of employees.

The building of a modern air-conditioned club-house for our employees, run by them for social and athletic affairs.

A modern restaurant serving, at low cost, meals that have been supervised by a nutritional expert.

Peace of mind to all through the providing of group life, sickness and accident insurance as well as an old age pension plan.

Tribune Medical Service

CHICAGO TRIBUNE'S Medical Counsel Service was established January 2, 1939, "to assist employees and their families in obtaining competent medical care and proper hospital facilities within their ability to pay." The report for 1941 by DR. IRVING S. CUTTER, *Tribune* Health Editor, shows that the service during the year included 11,424 visits, averaging about four

for each employee. This was an increase of 2,211 over 1940. In 10,146 of the cases the aid was given by the nurses, LOIS BRIGHT and MARGARET LACEY, and in 1,278 by DR. FRED FITZ and his successor, DR. THEODORE R. VAN DELLEN. Of the total visits about 90% were to assist employees; the remainder were with reference to members of their family. The calls, on the part of the nurses, averaged sometimes as many as 70 a day, either at the office or at the employees' homes. The published summary mentions some interesting cases, typical of the benefits derived from the plan:

"A man cut himself while shaving. After several days a sore developed and, although it was painless, the employee decided to have it examined. The examination lasted about half an hour. The diagnosis was cancer. The employee immediately was referred to a specialist. An operation was performed and the man's life saved.

"A woman was told by an outside doctor that she had a dangerous tumor and that an expensive operation was necessary. She asked the *Tribune* service for advice. She was sent to a specialist, who found that the original diagnosis was incorrect. Her condition was corrected by far less drastic and expensive means than the first doctor had proposed. The son of a *Tribune* worker suffered for months after his nose was broken. His doctor was charging high fees for treatment which was ineffective. The boy was referred to a specialist. The defect was remedied quickly."

The advice to employees and members of their families has included "everything from sore throats to pulmonary tuberculosis."

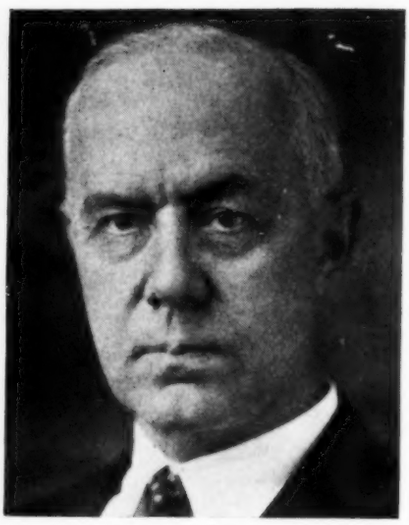
American Association of Industrial Physicians and Surgeons

1942 Convention

THE industrial medical field is looking forward this year more than ever before to the joint meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS and the AMERICA INDUSTRIAL HYGIENE ASSOCIATION. This — the Twenty-Seventh Annual Meeting of the A.A.I.P.&S., and the Third Annual Meeting of the A.I.H.A.—will be held at Hotel Gibson in Cincinnati, April 13-17, with a program of timely importance and special value, in view of the wartime basis of practically all manufacturing industries. The program committees are working out a grouping of subjects for the various sessions so that those whose convention time will be limited can select the day, or even the session, of the matters that will be of maximum interest to them. From all indications the attendance will be as unusual as the program. Hence it is suggested that all who have in mind to be present at any of the sessions make their hotel reservations as early as possible. An extensive and instructive presentation of scientific and technical exhibits is also being arranged, with program time allowances for visiting them.

Resigns as Secretary

AT THE Twenty-Sixth Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, held in Pittsburgh in May, 1941, DR. VOLNEY S. CHENEY was elected Secretary-Treasurer of the Association for the fourteenth consecutive term. At that time, however, it was necessary to prevail upon him to accept the position. His acquaintance with the members of the Association and his knowledge of its affairs were so extensive and thorough that everyone wanted him to continue. He, also, wanted to continue, but the medical department of Armour and Company, of which DR. CHENEY has been Medical Director since 1920, was growing—not so much as to the number of employees or the need for services in any one place, but rather as to both in an increasing number of places in all parts of the country. This, with tempo accelerated by the war emergency situation, required such an increasing amount of travel on his part as to cause him late last year to decide that in fairness to the Association he should offer his formal resignation. The reluctance with which this resignation was accepted by the Board of Directors at its meeting in January is expressive of the regret of all concerned — directors and members alike—to have him relinquish the office he had held so long, and filled so fully with the loving care that was part of his deep interest in the Association and its affairs. One of its founders, at Detroit in 1916, and Editor of its *Bulletin* until it was merged into INDUSTRIAL MEDICINE in 1933, he has been a tower of strength to the Association throughout all of its history. His absence will be felt; the Councils of the organization have lost the presence of a good man.



Volney S. Cheney

New Office

THE attention of A.A.I.P.&S. and Component Society members is called to the Association's new office address, which, after February 1, 1942, is at No. 1211, 28 East Jackson Boulevard, Chicago. Until the Annual Meeting in April the duties of the office of Secretary-Treasurer will be handled by DR. EDWARD C. HOLMBLAD, Managing Director, who may be reached at the new address.

Committees

THE A.A.I.P. & S. Board of Directors held a meeting in Chicago, January 12, at which, as a part of the session's business, a number of the standing committees (see p. 4 for their names and personnel) made progress reports. DR. KEHOE'S account of the preparations for the 1942 Annual Meeting indicated that his committee has been effectively busy. The final report of this group will be the convention itself—when the meetings are over the committee's report will have been made. The progress indicated by some of the other committees, particularly DR. LYNCH'S on National Defense and DR. KRONENBERG'S on Medical Education, were forecasts of interesting and valuable reports to be given in full at the convention.

Chemical Gas Gangrene from Metallic Magnesium

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MANY metals possess the capacity to liberate hydrogen from water and other hydrous fluids such as physiologic saline. This fact so far as known has been without clinical medical significance until the recent beginning of the widespread application of metallic magnesium and some of its alloys in industry. With the planned production of at least 400 million pounds annually, any prospect of worker damage from magnesium liberated gas becomes investigation worthy.

In a somewhat scanty literature later presented it has been stated that injuries from light metals including magnesium are especially prone to infection. Without denying this possibility, this present publication is not concerned with this aspect of toxicity although it is recognized that the extensive necrosis later described may be favorable to bacterial propagation. Likewise in the literature, statements may be found to the effect that superficial injuries from light metals, in addition to unusual inflammation, may lead to multiple nodular tubercle-like growths highly resistant to normal healing processes. Granting this possibility, this present investigation has little concerned itself with such lesions. Still further a larger portion of available literature is devoted to fires from the dust and swarf of magnesium and other light metals. In all truth such fires constitute an outstanding danger in light metal industries, but form no portion of the presentation here made. This presentation solely is limited to the gaseous formation resulting from the experimental implantation of light metal dust, spicules and shavings, the nature and quantity of such gas and the necrosis concomitant thereto.

Literature

MANY publications not here mentioned provide ample information as to the properties of magnesium and other light metals, their actions in the presence of fluids, industrial manipulations, alloys and uses. At the present time, the almost exclusive use of metallic magnesium is in the form of its alloys in aircraft construction.

Recognition that light metals and particularly magnesium may produce an unusual type of tissue damage apparently was first made in Germany just prior to the present war. Military secrecy has precluded any adequate dissemination of facts. Available foreign information that has trickled into England apparently was from or through Switzerland, although later in this section a record of Italian experience, contemporary with the German or Swiss report, will be cited. In the *Technische Rundschau* (Bern)[1] are presented, according to *Light Metals* (London, May, 1941)[2] the results of recent investigations upon etiology of intractable injuries caused by light metal alloys. While the English account states that the Swiss publication is based primarily upon the work of Bufe and Gissel, it is not manifest that these are the authors of the report. These statements as to the paucity of citation material are made in fairness to other possible authors. The findings of Bufe and Gissel are summarized as follows, from *Light Metals:*

"Injuries caused by light metals tend to pursue a course characteristically different from and more severe than those resulting from the heavy metals. The examination of 5000 instances of such injury has enabled the investigator to establish the fact that two well defined types exist. In the first a visible particle of metal is found. If the injury be not treated there ensues in two or three days a rapid and progressive inflammation at the site and in the lymphatic system. Vacuole formation occurs as the result of hydrogen formation consequent upon chemical reactions between the metal and the fluids in the tissue. In the second type of injury the causative agent is metal dust which enters a wound resulting probably from some other accident. The wound heals rapidly but a painful granulomatous infiltration which may persist for months occurs. Subsequently these suddenly develop acute symptoms of inflammation as in the first type of injury. Vacuole formation however does not occur. Instead granulomatous cells and eosinophiles together at times with giant cells are found."

From this sketchy report together with an earlier one by Bufe, a number of disconnected excerpts are now made, but with the proviso that none of these statements necessarily represents the opinion of the present authors, whose work is later shown.

"A toxicity for magnesium and aluminum in the sense that lead or cadmium is toxic is categorically denied . . . . As opposed to the majority of heavy metals, the light metals yield large volumes of hydrogen when acted upon either in the body or in vitreo by tissue fluids. . . . Radiographic diagnosis is possible only when the particles are of a size above 1 mm. and then only with special x-ray technique. . . . . Pronounced and serious inflammation extending in the majority of instances over the entire lymphatic system or less frequently giving rise to intractable granulomatous lesions are especial features. . . . On agar cultures the inhibiting effect of heavy metals on the growth of microorganisms readily could be determined, but not so in the case of light metals. . . . In normal saline magnesium alloys cause the rapid evolution of gas with discoloration of the solution. . . . Oxidation processes in the cells are disturbed and the recuperative powers of the tissues lowered as a result of the damage from the gas or other actions of the metal or its decomposition products. . . . As early as ten or fifteen years prior to 1941, medical workers handling magnesium-aluminum alloy injury cases recognized that they were unusual and troublesome, but their nature was not then established."

Tinozzi[3] in Italy in 1941 reported his experience from a laboratory (guinea pigs) investigation. The good record in Italian is followed by a somewhat garbled summary, in English, now shown in modified form:

"The author studied experimentally the actions on the tissues of some alloys, light metals and the several constituents of these alloys. Aluminum and above all magnesium exhibited necrotic alterations. Among the alloys, particularly the ones which contain more magnesium exhibited serious necrotic alterations which were much more intense than the ones produced by corresponding pure metals. The author holds that the hydrogen formed by the action of magnesium on the tissues is of no importance for the genesis of the necrosis. Though the alterated tissues show a remarkable tendency to infections, the first cause of such injury is not of an infectious nature. The author believes that electrophysical causes were playing a role and that the action on the tissues may be brought about by electromotive influences caused by the contact of the metal with the tissues; these phenomena are more intense when the light metals form alloys."

Pertinent to the matter of magnesium alloys, magnesium and other light metal fires are papers by

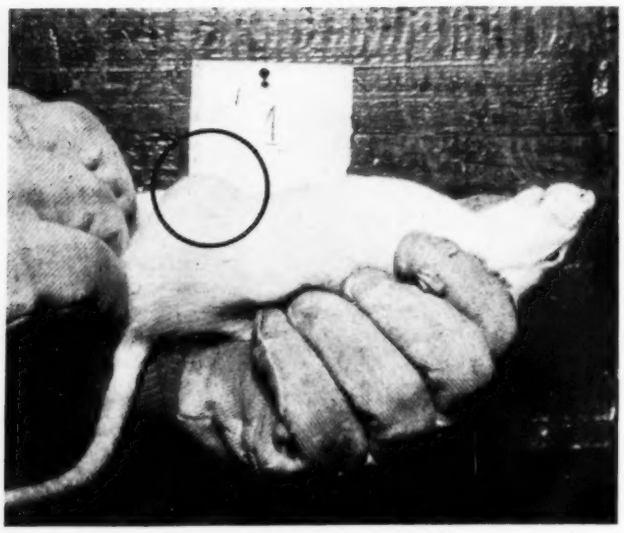

Fig. 1.
External view of multiple gaseous cysts, five days after deep subcutaneous deposition of metallic magnesium

Berger,[4] Hirst and Guise,[5] Durston and Bleyberg,[6] Whitburn,[7] and an editorial article in *Light Metals*[8] which refers to the German decrees of 1938 providing legal measures for the meeting of the extraordinary problems of magnesium industrial manipulation. These laws in detail are discussed in a publication of the German Minister of Labor, H. H. Bohm, in *Metallwirtschaft* (Reference unknown).

Present Investigation

IN THE corporation chiefly concerned in the production of this report, military requirements necessitate the creation or manipulation of large numbers of magnesium, and aluminum and magnesium castings, and sheet materials of magnesium alloys, together with other castings and other sheet metals containing varying amounts of magnesium. In the required industrial processing of these materials, necessarily there will arise metallic dusts, spicules, turnings, swarf, and metallic fume at whatever point castings may be made. Already adequate safeguards have been introduced prior to production activities so that the present investigation represents potentialities as created in laboratory animals and is not based on human experience.

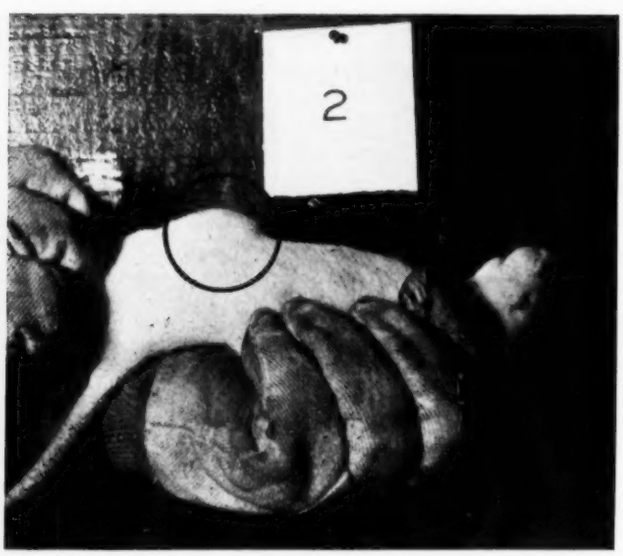

Fig. 2.
Single gaseous cyst five days after deep subcutaneous deposition of metallic magnesium

(A) TEST MATERIALS AND ANIMALS

The metallic materials thus far used in this study are particulate material of essentially pure magnesium, aluminum and manganese and particulate material, spicules and turnings of essentially pure aluminum and alloys of magnesium and aluminum. These alloys chiefly consisted of aluminum and magnesium in varying proportions, but at times with various additives. A typical alloy analysis is here shown:

Aluminum	5.3-6.7%
Manganese	0.15
Copper	0.05
Silicon	0.3
Nickel	0.01
Zinc	2.5-3.5
Impurities	0.3
Magnesium	88.99-91.39—up to 100%

Rabbits and white rats of high grade were utilized in this study, 76 all told, and chiefly white rats.

(B) PROCEDURE

At the outset, sharp pointed spicules of metal were forced beneath the skin of shaved animals, several such splinters in each of the animals. In others the skin was incised and the shavings of metal implanted. Neither of these procedures was fully successful, since it was impossible to determine that any gas was produced. In a second small group of animals, superficial mechanical abrasions were brought about into which were rubbed powders of various metals. Although unexpectedly severe reactions occurred from magnesium, this step was abandoned, as apart from the project at hand.

Finally the metallic materials were reduced to a fine powder, such as would pass through the lumen of an 18-gage needle. These powders were produced by hand and screened through fine mesh sieves. An arbitrary injection amount of 100 mgms. was selected as desirable, but some difficulty was experienced in bringing about suspension of these light metals in saline, with or without the addition of traces of wetting agents and in the regular procurement of such particle size as would pass through the needle lumen. As a result, few or no animals received the full injection of 100 mgms. Precisely it may be stated that no animal received more than 100 mgms., the estimated average being 50 mgms. In the greater number of animals injected hypodermetically the particulate material was introduced subcutaneously in the abdominal region, while in other animals the metallic material was implanted intraperitoneally. Not all work was carried out under fully aseptic conditions, although effort was made to sterilize all implements by boiling.

(C) RESULTS

In the animals injected subcutaneously and into the muscular abdominal wall there appeared in the case of magnesium and high magnesium alloys and within 24 hours sizeable single or multiple gaseous tumors. The largest single tumor approximated the size of half of a small egg. At times three or four tumors in close proximity were discernible. These tumors reached their maximum between 36 and 48 hours and then some slowly diminished over a period of many days, but did not disappear. Specimen tumors from pure magnesium dusts are shown in photographic Figs. 1 and 2. Fig. 3 with its smaller gaseous tumor resulted from the injection of a magnesium-aluminum alloy in which the magnesium, the major constituent, approximated 89%. In the case of low magnesium-aluminum alloys (copper 4.2%, magnesium 1.5%, manganese 0.5%, bal-

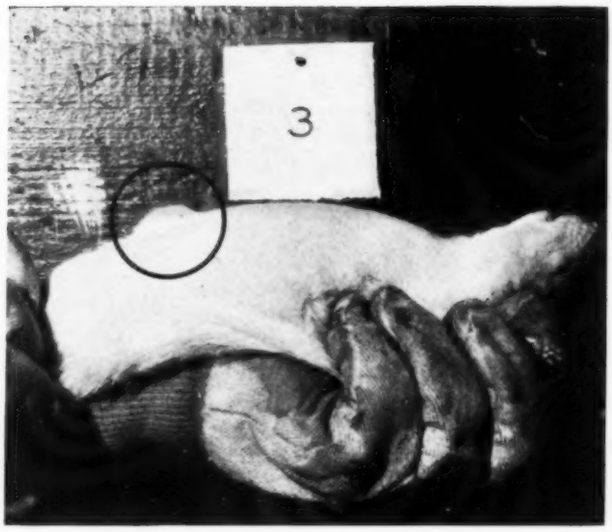

Fig. 3.
Small gaseous cysts fifth day after deep subcutaneous deposition of powdered magnesium-aluminum alloy material

ance aluminum) no gross gas was observable. Similar injections of aluminum and manganese respectively induced no macroscopic gas. In view of the statement found in the literature above cited that alloys with magnesium produce more gas than magnesium alone, it is here stated unequivocably that pure magnesium overwhelmingly produces more gas than any alloy investigated. Roentgen Figs. 4, 5 and 6 better reveal the size of these gaseous tumors.

(D) NATURE OF GAS PRODUCED

In previous publications it has been assumed or efforts have been made to prove that the gas generated on contact between magnesium and tissue is hydrogen. Theoretically this should be true and in truth at the initial formation hydrogen may be the gas generated. On the other hand, the quantity of hydrogen on analysis proved not to exceed 5%. Clearly some gaseous exchange will take place in the course of 48 hours so that the aeroform content of these tumors may not be expected to represent hydrogen alone. Further, due to necrosis such other gases as hydrogen sulfide may be expected to appear.

The determination of the nature of the gas concerned was carried out in a manner now described along with the results obtained. The apparatus utilized is shown in Fig. 7. Seven cubic centimeter Keidel vacuum tubes were utilized for the collection of samples. The furnished degree of vacuum was not sufficient and required re-exhaustion of air. The needle representing a portion of the Keidel apparatus was inserted into the largest gas pocket and the pressure valve on the tube released. Immediate tumor deflation occurred. It was necessary to puncture more than one tumor to obtain 7-cc. samples. In this manner, a total of 35 cc. of an unknown gas was obtained for examination.

Two 7 cubic centimeter tubes containing the unknown gas were introduced into one side of a 10-centimeter interferometer cell which had previously

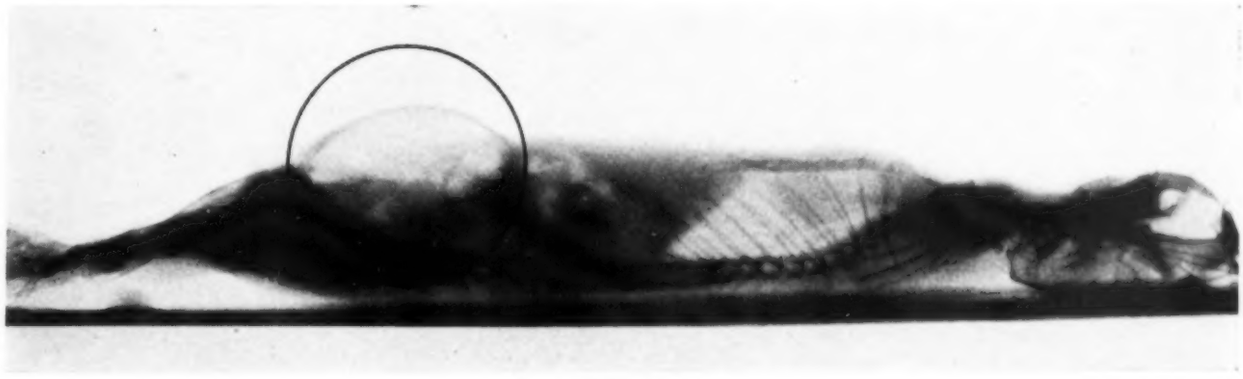

Fig. 4.
Lateral x-ray view of gaseous cyst in rat on fifth day after deep subcutaneous implantation of metallic magnesium

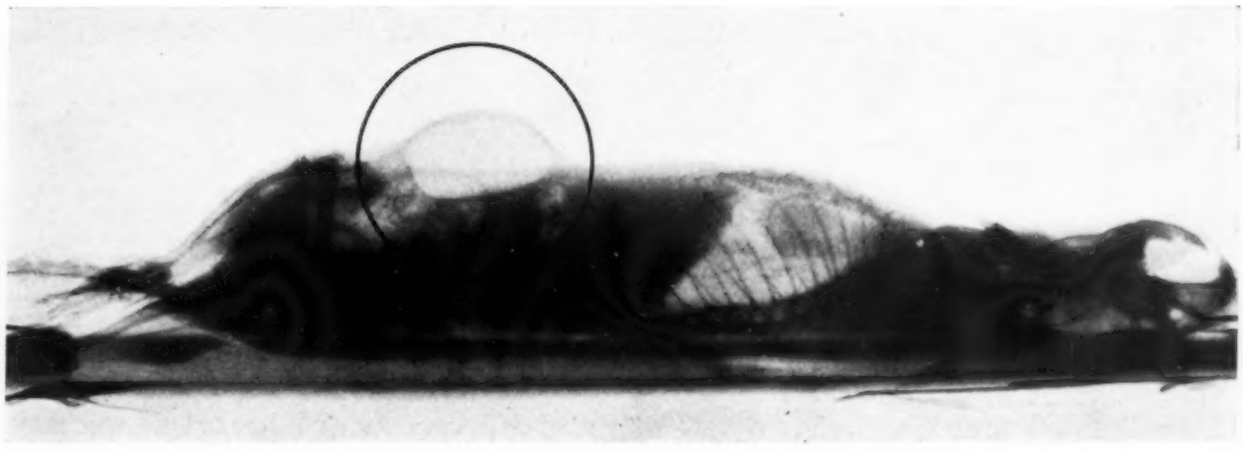

Fig. 5.
Lateral x-ray view of gaseous cysts on fifth day after deep subcutaneous implantation of powdered magnesium-aluminum alloy material (89% magnesium)

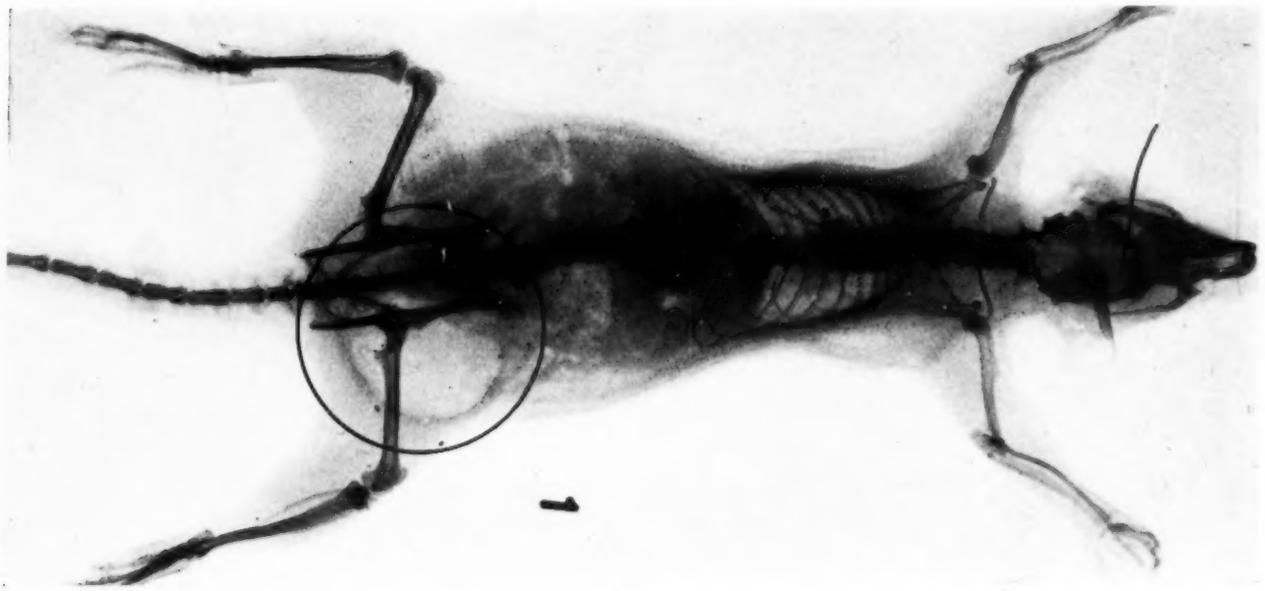

Fig. 6.
Antero-posterior x-ray view of rat showing gaseous cysts on fifth day after deep subcutaneous implantation of metallic magnesium

been evacuated to 10 millimeters. The Keidel tubes were then completely exhausted by filling with mercury as shown in Fig. 7. The unknown gases were made carbon dioxide and moisture free by passing them through a packed tube containing anhydrone and ascarite. The unknown gas was then compared with carbon dioxide moisture free air and the percentages of hydrogen calculated according to a method described by Edwards.[9] The interferometer was calibrated through a method also described by Edwards.[10] Using known refractivities for air and hydrogen, 2.2% of hydrogen was found.

When this gas was forced from the interferometer cell through a needle and attempts made to ignite the outflowing gas, no combustion was noted, which apparently confirms the result obtained, inasmuch as the lower combustible limit for hydrogen is 4.1%.

The remaining three tubes of gaseous material were analyzed in a research Haldane gas apparatus. The total amount of sample was 23.1 cc. and of this sample 1.3% was found to be carbon dioxide and 15.2% oxygen.

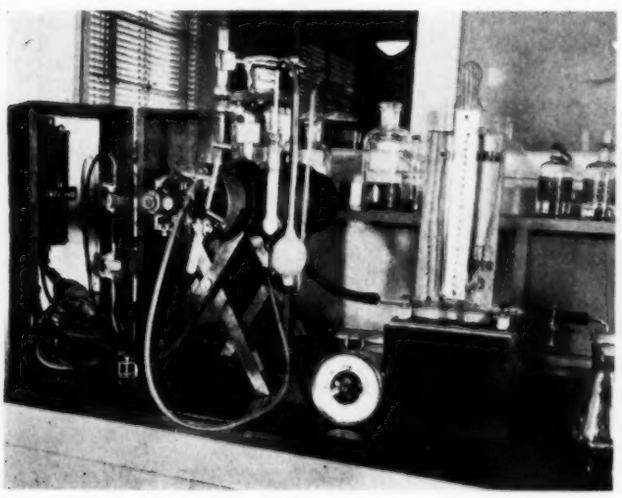

Fig. 7.
One of two types of apparatus utilized in determination of hydrogen percentage of gas extracted from necrotic cysts. Described in text

The indications are that carbon dioxide was generated by tissue degeneration as this quantity of carbon dioxide could not have been introduced from any other source, such as diffusion. The oxygen may have been introduced through a process of diffusion, but this is not definitely known at this time. The hydrogen, which should be the chief theoretical gas, is present in such small amounts as to lead to the belief that extensive diffusion has taken place. These findings do not eliminate the possibility that the initially formed gas was hydrogen.

(E) PATHOLOGY

Four rats with macroscopic gas tumors were killed by trauma, bled and immediately submerged in 10% formalin. All these rats six days previously had been injected in various levels of the abdominal wall with less than 100 milligrams of pure magnesium. Later these were examined by Dr. Osborne A. Brines, of the Wayne University Medical College, to whom grateful acknowledgment is made for pathologic examinations, photomicrographs and some illustrations. His report now follows:

"The specimen consists of four adult white rats. There is enough similarity in the pathological changes in all animals to warrant a single description.

On the ventral surface of each animal there is an

Fig. 8.
Gross anatomic specimen of abdominal wall of rats showing multiple cysts and necrosis, from which photomicrographs later shown were made

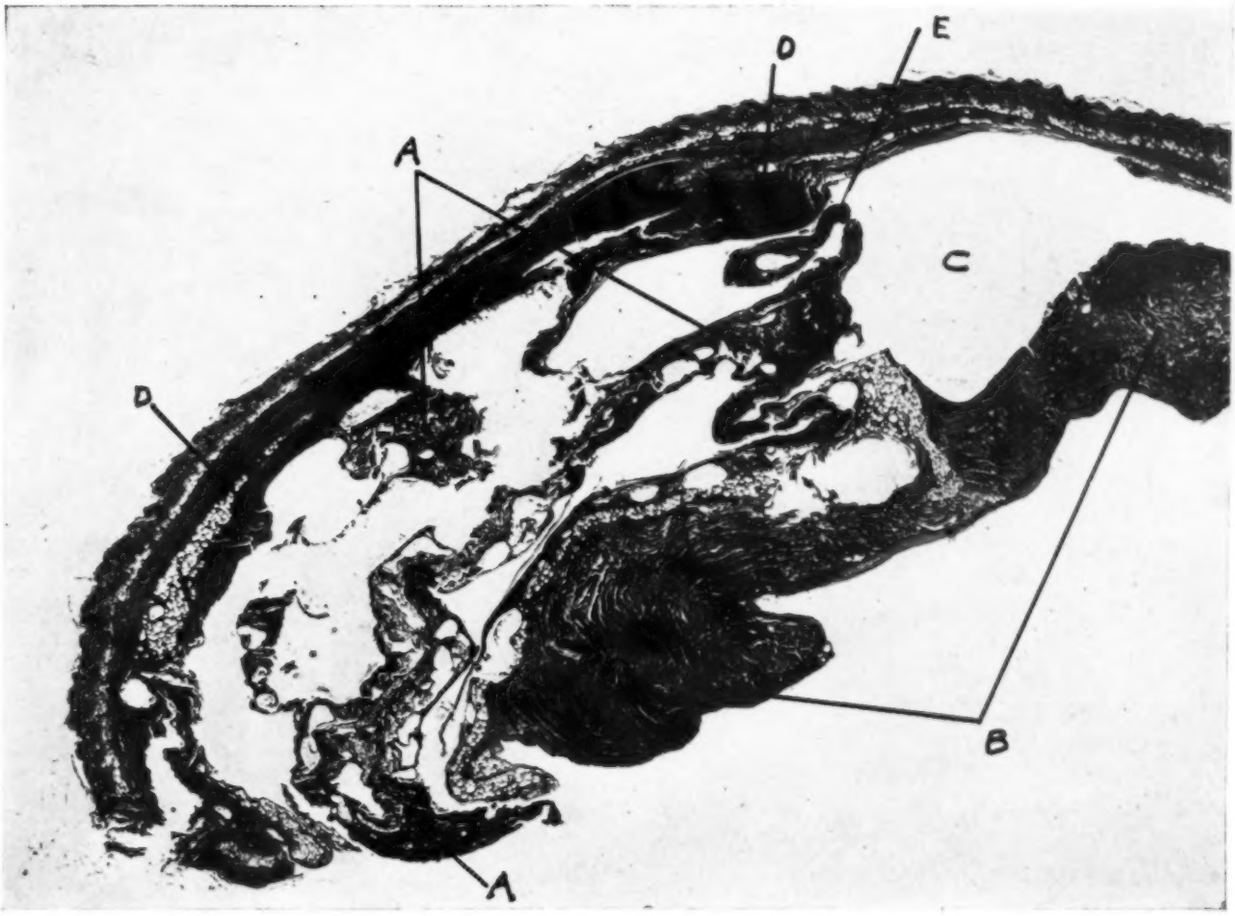

Fig. 9.
Photomicrograph of abdominal wall area: (a) Finely divided metal; (b) Necrotic muscle; (c) Gaseous accumulation; (d) Leucocytes; (e) Leucocytic exudation

irregular elevation measuring between 4 and 7 cm. in diameter and between 1 and 2 cm. in elevation. Each area is crepitant and there is some overlying bluish discoloration of the skin. In each animal this entire area of the anterior abdominal wall is excised. In two instances there was considerable extension of the emphysema into the groins and some gas escaped during excision causing some collapse of the air cysts. After thorough fixation in formalin, blocks of tissue approximately 5 mm. in thickness are cut completely across each specimen in an attempt to get the entire cross section of each lesion.

Upon microscopical examination it is found that the skin and subjacent subcutaneous zone are essentially normal. Throughout the subcutaneous fascia and muscle there is extensive necrosis associated with marked leukocytic response. In the subcutaneous tissue there are multiple emphysematous cysts measuring up to 2 cm. in diameter. The leukocytic infiltration is most dense about these cysts and there is some actual suppuration into an occasional cyst. A small amount of the injected material is present, but has not produced any appreciable foreign body granulomatous reaction.

MICROSCOPICAL DIAGNOSIS:

Necrosis of muscle and fascia with extensive subcutaneous emphysema associated with leukocytic infiltration and early suppuration.

Tissue sections made through the entire tumors revealed many large vacuoles constituting multilocular cysts."

See Figs. 8, 9, 10 and 11.

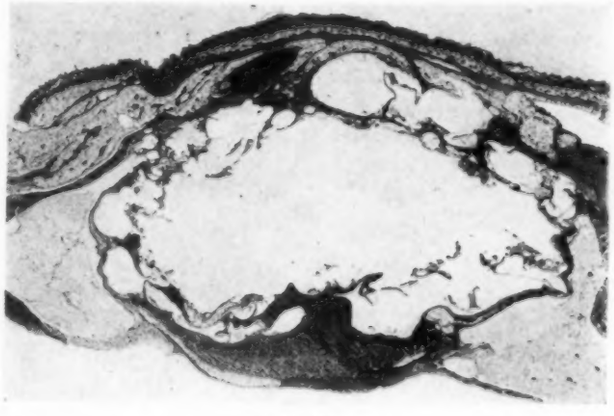

Fig. 10.
Photomicrograph of abdominal wall of rat showing pathology similar to that of Fig. 9

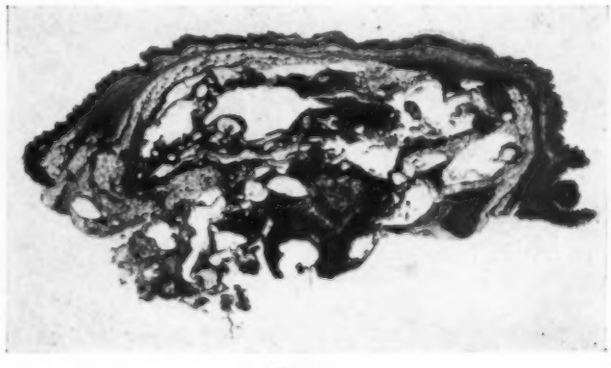

Fig. 11.
Photomicrograph similar to that of Fig. 9 but presenting many multilocular cysts

Projected Investigations

A SCANTY literature and our own observations thus far leave undisclosed many facts clearly needed in connection with possible clinical injuries from light metals. A number are now mentioned.

1. The extent of necrosis seemingly is out of proportion to the traumatizing effects of vacuoles. While Tinozzi attributes this necrosis to electrical currents, proof does not exist. It is desirable to study the effect of slowly introduced hydrogen and other gases apart from the presence of any implanted light metal.

2. While the generation of gas from relatively large amounts of implanted metal clearly is established, the need exists for microscopic tissue studies as to the formation of minute vacuoles from mere traces of implanted metal.

3. The extensive lymphangitis mentioned in the literature is scarcely consistent with anticipated developments after the implantation of metal and in the absence of infection, unless it be assumed that particulate metallic particles enter lymphatics and set up chemical changes at remote points. This requires additional inquiry.

4. In our own work, all injections were made with metal suspended in hydrous liquids. This facilitates hydrogen formation so that it probably becomes true that equally large gaseous cysts would not have been produced if the metallic materials had been introduced in dry form or suspended in oils.

5. Obviously, supplemental work should include suitable blood studies and present observations should be repeated under fully aseptic procedure.

6. Claims elsewhere made and not here confirmed that mixtures of aluminum and magnesium are more active than magnesium, invite scrutiny. The assumption that tissue damage is due to electrical currents would be favored by such metallic mixtures.

7. Statements elsewhere appearing that gas pockets if not emptied may persist for a 12 months' period are neither affirmed or denied in this present report. Our observation is that these gas tumors diminish in size after some 48 hours. However, this may be due to gaseous extension by extravasation to nearby areas. It is not denied that a vacuole that acquires a definite wall will persist but any retained content of hydrogen is dubious. Obviously any retained sizeable vacuoles in human cases is of clinical significance.

Comment

IT WAS anticipated that the cystic gas once drawn off would replace itself in some measure. Numerous animals were deflated other than those used for gas analysis purposes. Some did refill, but in others results were uncertain.

2. Patently the surface area of particulate material affords the best opportunity for gaseous formation. Conversely under actual work conditions dealing with spicules and metallic foreign bodies en masse, proportionate degrees of gas formation may not be anticipated.

3. During the period of observation of injected animals extending over several weeks, only one died, death being due to gross necrosis of the cystic area. Other animals appeared substantially healthy except that all lost weight. In this phase of the investigation, no blood counts were made, no extensive examinations for spreading lymphangitis or other clearly needed observations.

4. Injections of metallic material intraperitoneally led to the formation of no gas that was detected—at least there was no obvious distension of the abdominal cavity. On metallic injections intraperitoneally, all animals underwent an unknown type of immediate shock during which for a few moments they were prostrate.

5. The aeroform fluid of these induced gaseous cysts commonly remain localized, usually in dome-shaped tumors, but in some instances emphysema extended into the groins and along the thighs.

6. Pure aluminum, manganese and aluminum alloys with a magnesium content on the order of 1.5 to 2.5% produced no macroscopic gas but no examinations were made for microscopic vacuoles. Alloys in which the magnesium content was high and on the order of 90% proportionately produced much less gas than pure magnesium, as indicated in Fig. 3.

7. In the event of a puncture wound of industrial workers by magnesium or high magnesium alloys, it will become desirable that every trace of metal be removed early in treatment. Because of difficulty in detecting small pieces of metal, justification exists for the removal of excess tissue in order to assure the removal of the offending metal.

Summary

LIGHT metals and particularly magnesium on contact with aqueous fluids, liberate a gas both in the body and in vitreo. Puncture wounds from metallic magnesium or some alloys may because of the phenomenon just mentioned lead to injury of a type more severe than ordinary foreign body injuries. Under experimental conditions, less than 100 mgms. of metallic magnesium produced within 24-36 hours single or multilocular gaseous tumors yielding on puncture near to 5 cubic centimeters of gas. Initially the gas is believed to be hydrogen, but through diffusion and admixture other gases come to dominate the chemical analysis. The clinical picture is one of chemical gas gangrene or necrosis. Actual human experience in the United States is limited or at least not known to have been published, but in case of puncture wounds unfailingly it becomes the duty of the attending physician to remove all portions of the gas-liberating magnesium.

Bibliography

1. Experimentelle Grundlagen der Leichtmetallverletzungen. *Technische Rundshau* (Bern), January 24, 1941.
2. Injuries Caused by Light Metals. *Light Metals*, 4:106 (May) 1941.
3. TINOZZI, F. P.: L'Azione Sui Tessuti di Alcuni Metalli Leggeri (Action of Light Metals and Their Alloys on Tissue. Experimental Study on Metals Used in Aviation Industry). *Medic. Sperim.* 8:130, 1941.
4. BERGER, H.: Bases of Safety in Light and Ultra-light Alloy Manipulation. *Light Metals* 4:44, March, 1941.
5. HIRST, H. S., and GUISE, A. B.: Magnesium and Its Alloys. *National Fire Association Quarterly*, April, 1941, p. 374.
6. DURSTON, G. H., and BLEYBERG, W.: Fire Hazards Attributed to Light Metals. *Light Metals*, 4:89, May, 1941.
7. WHITBURN, L.: Fire Hazards when Machining Magnesium and Its Alloys. *Light Metals*, 4:75, April, 1941.
8. Safety Measures in the Working of Magnesium Alloys. *Light Metals*, 2:147, April, 1941.
9. EDWARDS, J. D.: Application of Interferometer to Gas Analysis Tech. Papers, Bur. Standards, No. 131, October, 1919.
10. EDWARDS, J. D.: Gas Interferometer Calibration. Bur. Standards Scientific Paper No. 316, December, 1917.

Lighting, Ventilation and Safety in Factories During Blackout

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THERE are two countries which have obtained large experience in this subject: England and Germany. In this article I will report the experiences of the German industrial hygienists as far as these have been published in the journal *Zentralblatt fur Gewerbehygiene* in 1940 and the first months of 1941 by factory inspectors and engineers of the Lighting Society.

The reports and suggestions refer to the Blackout Law and to the peacetime regulations which standardize light requirements for every kind of work.

There are some differences in the appreciation of the practical value of the methods published but it seems that all these methods serve their respective purposes under suitable conditions. These conditions comprise the particular construction of the factories, the various sections of a factory and, last but not least, the factory yards, tracks, switching yards, etc., all of which must be protected against air raids.

At the "Congress for protection of workers during the blackout," held in December, 1939, principles for lighting of factories under blackout by mechanical means were discussed.* At that time light-blocking filters were admitted only as an exception. It was also suggested to dim the indoor lights by reduced voltage and to light up the individual apparatus, machines, etc., by luminous paints. During the ensuing months much experience was gathered. The following principles have been established:

From an altitude of about 1500 feet no light must be seen.

Quality of work must not be reduced and no strain on the workers' eyes should arise.

Ventilation should be satisfactory.

Accidents must be avoided.

To provide these results there are several methods which should be applied according to the kind of production, the size and position of the windows or glass roofs, the arrangement of shifts, the degree of work subtility required, the presence of dangerous gases, vapors or dusts, etc. Of course, the methods can be combined.

We will describe first the blackout and lighting methods, then the ventilation under blackout, and, last, the safety measures which become necessary under the changed conditions.

Blackout

MECHANICAL WAY: During the night windows and other transparent surfaces of the factory are covered with closely fitted wooden boards, tar paper, rolling or folding blinds, venetian blinds, linen or paper curtains, etc. In daylight the blinds can be opened by means of rolls or winches, or tipped over around a pivot point. There are difficulties in the case of modern constructions with large glass panes, especially in winter with cold and snow. For such purposes, generally for large glass surfaces, another blackout method is to be preferred.

2. *Light-blocking filters,* also called the method of complementary colors, operate by virtue of the fact that glass of a certain color will not pass light of a certain other color; for instance, a certain grayish-green paint on the outside of the glass panes, with the inside of the room lighted by reddish or orange light or the yellow light of sodium mixed with normal incandescent light, assures invisibility from outside during the darkness, while sufficient light is passed by the panes in daytime.

The color for painting the glass surfaces must be weatherproof and heatproof, and must not leave any shining or blinking effects of the glass surfaces in time of moonlight, etc.

These colors pass a great portion of the daylight; they are claimed to absorb only 20-30% of it.

This method of blackout is useful for crude and slowly progressing work, also for stairways, lobbies, passageways, and storerooms. Where the workers have to distinguish colors during their work, the light-blocking filter method is not suitable. It is important that, to obtain well blended white light, 10% of the glass surfaces should be free of color and, of course, have to be covered during the night.

This method is not as safe as the first one and, in certain cases can be combined with the following.

3. *Method of reducing the lighting* as such: (a) by reducing the voltage; (b) by dimming the individual light (for the rooms) through the use of less efficient bulbs; (c) by fitting shields or blinds to the lamps.

Reducing of voltage is possible when the circuit for the general lighting of the workrooms is separated from the circuit for the bench lamps, because these lamps for the individual workers can not be reduced in intensity but must be equipped with such blinds and shields as are found necessary. For the bench lights lamps with a concentrated beam are useful. Reduced voltage with good blinds is suitable especially for power stations which must work throughout the air raids, for factories with no subtle work like chemical plants, for outdoor stores, passageways, yards, and switching yards. When the lighting of yards, tracks, switching yards, etc., is sufficiently shielded, it is not necessary to switch off the light during the air raids. Generally the light outside can be stronger if lamp is higher over the ground — a lamp 40 ft. high may be of 300 watts; for a height of 30 ft., 150 watts. The uniform lighting of the ground is important. Here broad flat shields are used.

In all these cases the important or dangerous points should be designated by the method of

4. *Luminous paint.* There are three kinds of luminous paints: (a) persistent or phosphorescent luminous paint which has to be exposed to daylight before use; (b) fluorescent paint which must be constantly exposed to invisible ultra-violet light from a mercury lamp or an ordinary electric bulb covered with a blue glass filter; (c) radioactive light from mesothorium which gradually changes to radiothorium. The alpha rays radiated fall on the surface painted with zinc sulphide which produces the light.

All these kinds of light are very important to mark important places or surfaces because they produce no beam which could be seen from above. The luminous substance is painted on strips or foils of celluloid or on surfaces of wood, paper and other materials.

Work which produces considerable glare, such as electric arc welding, must be done during the day or, in emergency cases, shielded by large blinds.

Of course, the operation of all these arrangements should be rehearsed in daylight.

Ventilation

NORMALLY natural and mechanical ventilation is used in industrial plants, factories and workshops. While the mechanical ventilation can be maintained, the natural one, through windows and doors is out of action during the blackout. Working-pauses for opening the windows during the blackout may be arranged. In factories where the windows are on both sides of the building, opposite to each other, ventilation holes about 16 inches square are cut through the walls, 7 to 8 ft. above the floor with a grill on the outside and a valve on the inside. Two blinds in the hole are so arranged that the air can circulate, while no light can be seen from outside.

There is also a kind of venetian blind built up from boards which are mounted under an angle of 45° in such a way that the air can circulate but the light from indoors can not be seen outside. Doors must be protected by a light trap. Of course, particularly dangerous work must be done during the daylight hours, if that is possible. The same holds for work like forging which produces large flames and smoke.

*According to the regulations "Normblätter Din 5034 and 5035."

Protection Against Accidents

NEARLY every author emphasizes the fact that the number of accidents is increased in wartime production. Besides the rising number of old men and inexperienced women who are now employed in industry, a very important reason for the rising number of accidents is the blackout. Here we can give only a few examples, because the circumstances in every factory differ widely.

It must be realized that night-blindness is frequently found in old men. Dangerous work should be done during the day shift.

Every dangerous part of a machine, every tap or control for hot or toxical or otherwise dangerous fluid must be designated by luminous paint, when general lighting has been reduced. Stairways, lobbies, storerooms and the like have to be designated in the same way. Generally outdoor passageways, tracks, switching yards, holes, etc., must be designated by luminous paint or by white paint, since outdoor lighting will be reduced in any case.

The highest possible degree of order should be maintained in all the rooms and parts of the factory.

Canvas Lining for 'Basket' Stretcher

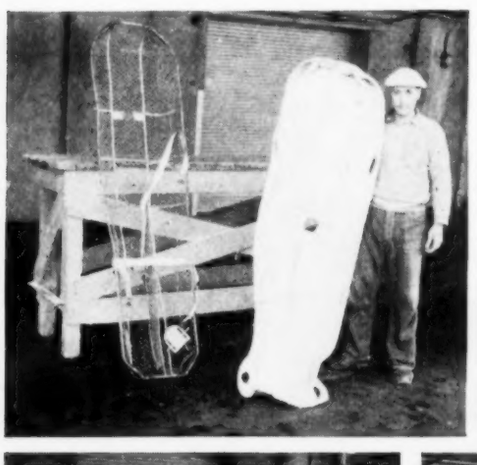
CHRISTOPHER LEGGO, M.D., *Plant Physician,*
and
A. F. RIEMKE, *Safety Engineer,*
California & Hawaiian Sugar Refining Corporation,
Crockett, California

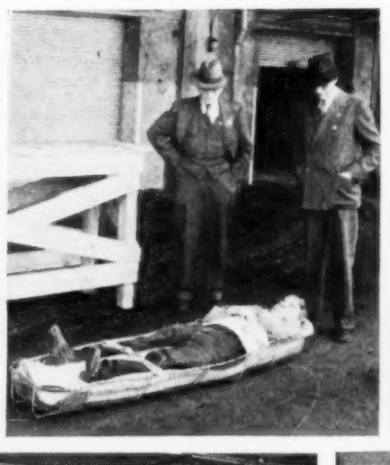
IN A number of instances we had difficulty in removing seriously injured patients from the "basket" stretcher used in hoisting accident cases from the holds of ships at our dock. This difficulty will be readily understood by those who have been faced with this problem—particularly in the case of large men, who fit snugly in the stretcher. One has to use his hands to pry them out and risk compounding their fractures, or turn them face down, removing the stretcher like a cover.

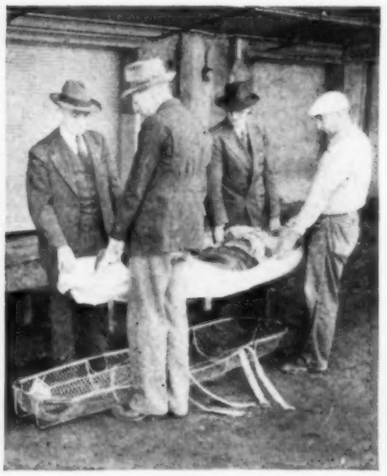
A number of years ago one of us (C.L.) placed the problem in the hands of the other (A.F.R.) with the suggestion that he experiment with a lining. The result of this effort has been used successfully numerous times since then, has proved its worth, and is being described and illustrated at this time for whatever purpose it may serve.

The lining is made of ordinary heavy canvas, is contoured to fit the division in the stretcher which separates the legs, and has hand-holes conveniently placed along the upper reinforced edge. The canvas is double along the bottom where the body lies, and the pocket thus made between the two thicknesses extends to form a separate pocket under each leg. Into this pocket is inserted a board, strengthened with metal and padded with felt on its upper side. This board actually forms a rigid table which bears the full weight of the patient when the lining is lifted from the stretcher. As a result, the patient is removed from the stretcher when the lining is raised and may be carried to the treatment table or bed without the slightest friction or motion as to any part of the body. When placed on the table the edges of the lining drop flat and the examination or treatment is not in any way interfered with. The board is easily removable from the pocket when the laundering of the canvas is desired.

We have not known of a similar method of meeting the handicaps of this type of stretcher. We have not described the technical details or measurements of the lining because, our first efforts at improvisation having







been successful, we feel that a minimum of experimentation will allow others to duplicate the essentials successfully. In the belief that such a lining has not been used by others and that its need is greater now than ever, we offer this brief description. The illustrations are self-explanatory.

Industrial Establishments Conducting Medical Services which are Approved by the American College of Surgeons

FOLLOWING is the list of medical services in industry in the United States and Canada, approved by the American College of Surgeons as of October 1, 1941. Approval is granted on the basis of compliance with the Minimum Standard for Medical Service in Industry formulated by the American College of Surgeons. The asterisk (*) indicates provisional approval which signifies that the medical services so designated have accepted the minimum requirements of the College standard and are endeavoring to put them into effect but, for lack of time or other acceptable reasons, have not been able to do so in every detail. A Certificate of Approval is granted to an industrial establishment in which the medical organization and service is fully approved and is of such a nature as to give reasonable assurance of continued compliance with the Minimum Standard. The approval that is granted to medical services in industry does not imply, tacitly or otherwise, approval of services of employee associations, with or without employers' aid, that are designed for the treatment of non-industrial injuries or illnesses.

The need for better organization and service in caring for the ill and injured in industry and for the elimination or control of industrial health hazards was early recognized by the American College of Surgeons. In 1926 a Committee on Industrial Medicine and Traumatic Surgery, which consisted of representatives of the College, of medical departments of insurance carriers, and of other industrial organizations, was appointed for the purpose of studying and, if at all possible, improving this situation.

Based upon experience and the findings of direct investigations the Committee on Industrial Medicine and Traumatic Surgery formulated a Minimum Standard for Medical Service in Industry which is applicable to all industrial organizations regardless of their size. Acceptance and maintenance of the Minimum Standard in its true spirit is entirely voluntary on the part of an industrial organization. However, since the essential features of an adequate industrial medical and surgical service are embodied in the Minimum Standard it is readily apparent that compliance therewith will be to the advantage of both employer and employee.

Minimum Standard for Medical Service in Industry

THE industrial establishment shall have an organized medical department or service with competent medical staff including consultants and also shall have adequate emergency, dispensary and hospital facilities and personnel to assure efficient care of the ill and injured.

2. Membership on the medical staff shall be restricted to physicians and surgeons who are (a) graduates from an acceptable medical school, with the degree of Doctor of Medicine, in good standing and licensed to practice in their respective states or provinces, (b) competent in the field of industrial medicine and traumatic surgery, (c) worthy in character and in matters of professional ethics; in the latter connection the practice of the division of fees, under any guise whatsoever, shall be prohibited.

3. There shall be a system of accurate and complete records filed in an accessible manner, such records to include particularly a report of injury or illness, description of physical findings, treatment, estimated period of disability, end results, as well as other information pertinent to the case or required by statute for Workmen's Compensation claims or other purposes.

4. Patients requiring hospitalization shall be sent to institutions approved by the American College of Surgeons.

5. The medical department or service shall have general supervision over the sanitation of the plant and the health of all employees.

The practical application of this Standard was begun by the College in 1931 by making personal surveys of industrial medical services on a nationwide basis and the first list of approved medical services was published in 1933. To date 1,834 industrial establishments, representing approximately 6,500,000 employees, have been surveyed of which number 959, or 52%, have been fully or provisionally approved.

At the Clinical Congress of the American College of Surgeons held in October of each year, public announcement is made of the approved medical services in industry and the list is published. It is realized that there are medical services recently organized and others that are worthy of recognition but of which time has not yet permitted a survey. Many requests for information and surveys are received by the College with which there is compliance without expense to industry. The surveys are arranged, of course, in as orderly a procedure as possible to include a large group of industrial organizations in a region, in order to reduce expense and duplication of travel.

Working Principles of an Adequate Industrial Medical Service

IT IS realized that small industrial organizations or plants do not require as extensive medical facilities as do the larger ones. Nevertheless, the principle implied in the Minimum Standard for Medical Service in Industry applies to both large and small plants. The type of medical department and the scope of the service may be adjusted to meet the needs of the establishment, but in general an adequate industrial medical service requires that the following provisions be made in order to render the best service:

1. A definitely organized plan for the medical service.
2. A definitely designated staff of qualified physicians, surgeons and attendants—with one physician in charge of the service.
3. Adequate emergency, dispensary and hospital facilities.
4. Pre-employment and periodic physical examinations —to be made only by qualified medical examiners.
5. Efficient care of all industrial injuries and occupational diseases.
6. Reasonable first aid and advice for employees suffering from non-industrial injuries and illnesses while on duty. For further professional care such employees should be referred to their own private or family physicians.
7. Education of the employee in accident prevention and personal hygiene.
8. Elimination or control of all health hazards.
9. Adequate medical records including physical examination records, accessibly filed in the medical department under responsible medical supervision. Statis-

tical summaries and analyses of the injury and illness experiences should be made periodically.

10. Supervision of plant sanitation and all health measures for employees by the physician or surgeon in charge.

11. An ethical and cooperative relationship with the family physician.

12. The use of hospitals approved by the American College of Surgeons.

UNITED STATES

In the second column the States are arranged in the order of their industrial importance

Alabama	13	New York	135
Arizona	3	Pennsylvania	113
Arkansas	—	Ohio	66
California	52	Illinois	72
Colorado	8	Massachusetts	57
Connecticut	32	Michigan	53
Delaware	3	New Jersey	60
District of Columbia	5	Indiana	38
Florida	1	California	52
Georgia	10	Wisconsin	12
Idaho	—	Connecticut	32
Illinois	72	North Carolina	3
Indiana	38	Missouri	25
Iowa	9	Georgia	10
Kansas	5	Texas	22
Kentucky	3	Maryland	35
Louisiana	6	Tennessee	4
Maine	12	Rhode Island	12
Maryland	35	Alabama	13
Massachusetts	57	Virginia	11
Michigan	53	Washington	3
Minnesota	13	South Carolina	2
Mississippi	—	Minnesota	13
Missouri	25	Louisiana	6
Montana	1	West Virginia	9
Nebraska	6	Iowa	9
Nevada	1	Kentucky	3
New Hampshire	3	Maine	12
New Jersey	60	Oregon	5
New Mexico	—	New Hampshire	3
New York	135	Florida	1
North Carolina	3	Mississippi	—
North Dakota	—	Kansas	5
Ohio	66	Arkansas	—
Oklahoma	9	Colorado	8
Oregon	5	Oklahoma	9
Pennsylvania	113	Nebraska	6
Rhode Island	12	Vermont	3
South Carolina	2	Delaware	3
South Dakota	1	Idaho	—
Tennessee	4	Utah	4
Texas	22	Montana	1
Utah	4	Arizona	3
Vermont	3	District of Columbia	5
Virginia	11	South Dakota	1
Washington	3	Wyoming	1
West Virginia	9	New Mexico	—
Wisconsin	12	North Dakota	—
Wyoming	1	Nevada	1

CANADA

Alberta	3	Ontario	10
Manitoba	3	Quebec	2

ALABAMA 13

BESSEMER
- *Pullman-Standard Car Mfg. Co.

BIRMINGHAM
- Alabama Power Company
- American Cast Iron Pipe Co.
- Lehigh Portland Cement Co.
- *McWane Cast Iron Pipe Co.
- *Stockham Pipe Fittings Co.
- Tennessee Coal, Iron & R. R. Co.

GADSDEN
- *Goodyear Tire & Rubber Co. of Alabama
- *Republic Steel Corporation

MOBILE
- Alabama Dry Dock & Shipbuilding Co.
- Southern Kraft Corporation

SYLACAUGA
- *Avondale Mills

WOODWARD
- Woodward Iron Company

ARIZONA 3

INSPIRATION
- Inspiration Consolidated Copper Company

JEROME
- Phelps Dodge Corporation, United Verde Branch

MIAMI
- Miami Copper Company

CALIFORNIA 52

ASSOCIATED
- Tide Water Associated Oil Co.

CROCKETT
- California & Hawaiian Sugar Refining Corporation, Limited

CULVER CITY
- *Metro-Goldwyn-Mayer Corporation

EL SEGUNDO
- Standard Oil Co. of California

EMERYVILLE
- Paraffine Companies, Inc.

LONG BEACH
- *Ford Motor Company
- *Procter & Gamble Mfg. Co.

LOS ANGELES
- Atchison, Topeka and Santa Fe Railway System, Coast Lines
- *Columbia Pictures Corporation
- Department of Water and Power, City of Los Angeles
- Firestone Tire & Rubber Company of California
- General Petroleum Corporation of California
- Goodrich, B. F., Company, The
- Goodyear Tire & Rubber Co. of California
- May Company, The
- Metropolitan Water District of Southern California
- Pacific Electric Railway Co.
- Paramount Pictures, Inc.
- *RKO Radio Pictures, Inc.
- Samson Tire & Rubber Corporation
- Sears, Roebuck and Co.
- Southern California Telephone Company
- Standard Oil Co. of California
- *20th Century Fox Film Corp.
- *Union Oil Co. of California
- *United Artists Studio Corp., Ltd.
- *Western Pipe & Steel Company of California
- *Wilson & Co., Inc.

MARE ISLAND
- Navy Yard

OAKLAND
- *Chevrolet Motor Company
- *Fisher Body Oakland Division General Motors Corporation
- Montgomery Ward & Co.

PITTSBURG
- Columbia Steel Company

RICHMOND
- *Ford Motor Company
- Standard Oil Co. of California

SAN FRANCISCO
- *Bethlehem Steel Company, Shipbuilding Division
- Columbia Steel Company
- Market Street Railway Co.
- Pacific Greyhound Lines, Inc.
- Pacific Telephone & Telegraph Company
- Southern Pacific Company
- Standard Oil Co. of California
- Tide Water Associated Oil Co.
- Wells Fargo Bank & Union Trust Co.
- Western Sugar Refinery

SANTA MONICA
- Douglas Aircraft Company, Inc.

SOUTH SAN FRANCISCO
- *Bethlehem Steel Company
- *Western Pipe & Steel Company of California

TORRANCE
- Columbia Steel Company
- *National Supply Company

UNIVERSAL CITY
- *Universal Pictures Corporation

WILMINGTON
- *Union Oil Co. of California

COLORADO 8

DENVER
- Colorado & Southern Railway Company, The
- Denver & Rio Grande Western Railroad Company
- Denver Tramway Corporation
- Gates Rubber Co.
- Montgomery Ward & Co.
- Public Service Company of Colorado
- *Swift & Company

PUEBLO
- Colorado Fuel & Iron Co.

CONNECTICUT 32

BRIDGEPORT
- *Bassick Company, The
- Bridgeport Brass Company
- Bullard Company, The
- General Electric Company
- Remington Arms Company, Inc.
- Singer Manufacturing Co., The
- Stanley Works, The
  - American Tube & Stamping Plant

BRISTOL
- New Departure Division General Motors Corporation

EAST HARTFORD
- United Aircraft Corporation

HARTFORD
- Aetna Life Insurance Company and Affiliated Companies
- Colt's Patent Fire Arms Manufacturing Co.
- Hartford Electric Light Co.
- Travelers Insurance Company

MERIDEN
- New Departure Division General Motors Corporation

NEW BRITAIN
- Landers Frary & Clark
- North & Judd Mfg. Co.
- Stanley Tools, Division of the Stanley Works
- Stanley Works, The

NEW HAVEN
- Berger Brothers Company, The
- *National Folding Box Company
- Sargent & Company
- Seamless Rubber Co., The
- United Illuminating Company
- Winchester Repeating Arms Co.

SOUTH MANCHESTER
- Cheney Brothers

STAMFORD
- Yale & Towne Manufacturing Company, The

THOMPSONVILLE
- Bigelow-Sanford Carpet Co., Inc.

TORRINGTON
- *American Brass Company, The

WATERBURY
- American Brass Company, The
- Chase Companies, Incorporated
- Ingersoll-Waterbury Co., The
- Scoville Manufacturing Co.

DELAWARE 3

EDGE MOOR
- du Pont, E. I., de Nemours & Company

NEWPORT
- du Pont, E. I., de Nemours & Company

WILMINGTON
- du Pont, E. I., de Nemours & Company

DISTRICT OF COLUMBIA. 5

WASHINGTON
- Chesapeake & Potomac Telephone Companies, The
- *Lansburgh & Bro.
- Navy Yard
- Washington Gas Light Co.
- *Woodward & Lothrop

*Provisionally Approved

FLORIDA 1

ST. AUGUSTINE
Florida East Coast Railway

GEORGIA 10

ATLANTA
*Atlantic Steel Company
Chevrolet Motor Company
*Exposition Cotton Mills
*Georgia Power Company
Railway Department
*Sears Roebuck & Co.

GAINESVILLE
Chicopee Manufacturing Corporation of Georgia

MACON
*Bibb Manufacturing Company
*Procter & Gamble Mfg. Co.

SAVANNAH
Central of Georgia Railway
Ocean Steamship Company

ILLINOIS 72

CHICAGO
American Can Company
Englewood Factory
Illinois Factory
Armour and Company
Automatic Electric Company
Bauer & Black, Division of The Kendall Company
Campbell Soup Company, Central Division
Carnegie-Illinois Steel Corporation
Chicago, Aurora & Elgin Railroad Company
Chicago, Burlington & Quincy Railroad Company
*Chicago Mail Order Company
Chicago, Milwaukee, St. Paul & Pacific R.R., Eastern Lines
Chicago & Northwestern Railway Company
Chicago, North Shore & Milwaukee Railroad Company
Chicago Park District
Chicago Rapid Transit Co.
Chicago, Rock Island & Pacific Railway Co., The
Chicago, South Shore & South Bend Railroad
Commonwealth Edison Co.
*Continental Illinois National Bank & Trust Company
Crane Co.
Cuneo Press, Incorporated, The
*Federal Reserve Bank of Chicago
Ford Motor Company
Illinois Bell Telephone Company
Illinois Central Railroad Co.
Interlake Iron Corporation
International Harvester Co.
McCormick Works
*Tractor Works
West Pullman Works
*Wisconsin Steel Works
Johnson & Johnson
Marshall Field & Company
Montgomery Ward & Co.
National Biscuit Company
*Owens-Illinois Can Company
Palmer House
Peoples Gas Light & Coke Co.
Procter & Gamble Mfg. Co., The
Public Service Company of Northern Illinois
Pullman Company, The
Pullman-Standard Car Manufacturing Company
Sears, Roebuck and Co.
Standard Oil Company (Indiana)
Swift & Company
Teletype Corporation
United Wall Paper Factories, Inc.
Visking Corporation, The
Western Electric Company
*White Cap Company
*Wilson & Co., Inc.

DECATUR
Staley, A. E., Manufacturing Company

EAST ALTON
Western Cartridge Company

LA GRANGE
Electro-Motive Corporation

LA SALLE
Marquette Cement Manufacturing Co.

LAWRENCEVILLE
Indian Refining Company

MAYWOOD
American Can Company
Maywood General Factory
Maywood Sanitary Factory
Proviso Factory

MOLINE
Deere & Company

MONSANTO
*Monsanto Chemical Works

NATIONAL STOCK YARDS
Swift & Company

NORTH CHICAGO
Abbott Laboratories
*Oakes Products Corporation

OGLESBY
Lehigh Portland Cement Co.

PEORIA
Caterpillar Tractor Co.

ROCKFORD
Ingersoll Milling Machine Co.
National Lock Company, The

ROCK ISLAND
International Harvester Co.
*Rock Island Sash & Door Works
*Servus Rubber Co.

WAUKEGAN
Griess-Pfleger Tanning Co., The
Johns-Manville Products Corporation

INDIANA 38

ANDERSON
Delco-Remy Division
General Motors Corporation

BUFFINGTON
Universal Atlas Cement Co.

EAST CHICAGO
du Pont, E. I., de Nemours & Company, Grasselli Chemical Department.
Youngstown Sheet & Tube Co.

EVANSVILLE
*Briggs Indiana Corporation
Chrysler Corporation
Servel, Inc.

FORT WAYNE
General Electric Company
International Harvester Co.

GARY
American Bridge Company
Carnegie-Illinois Steel Corporation

HAMMOND
Lever Brothers Company

INDIANA HARBOR
Inland Steel Company

INDIANAPOLIS
Chevrolet Commercial Body Division, General Motors Corporation
Kingan & Co.
Lilly, Eli, and Company
Link-Belt Company
National Malleable & Steel Castings Company
Prest-O-Lite Company, Inc.
RCA Manufacturing Co., Inc.
Real Silk Hosiery Mills, Inc.

KOKOMO
Chrysler Corporation

LAFAYETTE
Aluminum Company of America

MICHIGAN CITY
Pullman-Standard Car Manufacturing Company
Sullivan Machinery Company

MISHAWAKA
Mishawaka Rubber & Woolen Mfg. Co.
*United States Rubber Company
Ball-Band Plant

MITCHELL
*Lehigh Portland Cement Co.

MUNCIE
Ball Brothers Company
Delco-Remy Division
General Motors Corporation
Owens-Illinois Glass Company
Warner Gear Company

NEW CASTLE
Chrysler Corporation

RICHMOND
International Harvester Co.

SOUTH BEND
Bendix Products Corporation
Studebaker Corporation, The

SPEEDWAY
Allison Division, General Motors Corporation

WHITING
Standard Oil Company (Indiana)

IOWA 9

CEDAR RAPIDS
Quaker Oats Company, The
Wilson & Co., Inc.

DES MOINES
Iowa Packing Company
Northwestern Bell Telephone Company

MASON CITY
Lehigh Portland Cement Co.

SIOUX CITY
Armour and Company
Swift & Company

WATERLOO
John Deere Tractor Co.
*Rath Packing Company, The

KANSAS 5

IOLA
Lehigh Portland Cement Co.

KANSAS CITY
*Colgate-Palmolive-Peet Co.
Procter & Gamble Manufacturing Co., The.
Swift & Company
Wilson & Co., Inc.

KENTUCKY 3

LOUISVILLE
Ford Motor Company
Standard Sanitary Mfg. Co., Inc.

NEWPORT
Newport Rolling Mill Co., The

LOUISIANA 6

BOGALUSA
Great Southern Lumber Co.

MARRERO
Celotex Corporation, The

NEW ORLEANS
American Sugar Refining Co.
Holmes, D. H., Company Ltd.
New Orleans Public Service, Inc.
United Fruit Company

MAINE 12

BIDDEFORD
*Pepperell Mfg. Co.
Saco-Lowell Shops
*York Manufacturing Co.

CUMBERLAND MILLS
*S. D. Warren Co.

LEWISTON
Androscoggin Mills
*Bates Mfg. Co.
Lewiston Bleachery & Dye Works

RUMFORD
Continental Paper & Bag Corporation
Oxford Paper Company

SANFORD
*Goodall Worsted Co.
Sanford Mills

WATERVILLE
Hollingsworth & Whitney Co.

MARYLAND 35

BALTIMORE
*Abell, A. S., Company, The
American Can Company
Maryland Plant
American Sugar Refining Company, The
Baltimore & Ohio Railroad Company, The
Baltimore Copper Smelting & Rolling Co.
Bethlehem Shipbuilding Corporation, Ltd.
Campbell Metal Window Corporation
Chesapeake & Potomac Telephone Company of Baltimore City, The
Consolidated Gas Electric Light & Power Company of Baltimore
*Crown Cork & Seal Company, Inc.
*Eastern Rolling Mill Company
Emerson Drug Company
Fairfield Western Maryland Dairy
*Federal Tin Company
Hutzler Brothers Co.
Koppers Company
American Hammered Piston Ring Division
Bartlett Hayward Division
Maryland Casualty Company
*Maryland Glass Corporation
May Company, The
McCormick & Company, Incorporated
Montgomery Ward & Co.
National Enameling & Stamping Company
Procter & Gamble Mfg. Co., The
Revere Copper & Brass Incorporated
Schluderberg, The Wm.,—T. J. Kurdle Co.
Standard Oil Company of New Jersey
*Standard Wholesale Phosphate & Acid Works, Inc.
United States Fidelity and Guaranty Company
Western Electric Company
Western Maryland Railway Co.

CUMBERLAND
Celanese Corporation of America
*Kelly-Springfield Tire Co., Inc.

SPARROWS POINT
*Bethlehem Steel Company

UNION BRIDGE
Lehigh Portland Cement Co.

MASSACHUSETTS 57

ANDOVER
American Woolen Company, Shawsheen Mill

BEVERLY
United Shoe Machinery Corporation

BOSTON
American Mutual Liability Insurance Co.
Boston Elevated Railway
Edison Electric Illuminating Company of Boston, The
Liberty Mutual Insurance Co.
Navy Yard
New England Telephone & Telegraph Company
United Fruit Company

CAMBRIDGE
*Boston Woven Hose & Rubber Co.
Harvard University
Lever Brothers Company

CHARLESTOWN
Revere Sugar Refinery

CHICOPEE
Spalding, A. G., & Bro.

CHICOPEE FALLS
*Chicopee Manufacturing Corporation
United States Rubber Co.
Fisk Tire Plants

CLINTON
Wickwire Spencer Steel Co.

EAST WALPOLE
Bird & Son, Incorporated

EVERETT
Colonial Beacon Oil Company, Inc.
*Monsanto Chemical Company
Merrimac Division

FRAMINGHAM
Dennison Manufacturing Co.

HOLYOKE
American Writing Paper Company, Incorporated
Farr Alpaca Company
National Blank Book Co.
William Skinner & Sons

LAWRENCE
American Woolen Company
Ayer Mill
Wood Worsted Mills
Arlington Mills
Pacific Mills

LEOMINSTER
du Pont, E. I., de Nemours & Co., Plastics Department

LOWELL
Hockmeyer Bros. Inc.
Merrimack Manufacturing Co.

LUDLOW
*Ludlow Manufacturing Associates
MALDEN
Converse Rubber Company
NEW BEDFORD
*National Silk Spinning Co.
*Wamsutta Mills
NORTH PLYMOUTH
*Plymouth Cordage Company
PITTSFIELD
*General Electric Company
QUINCY
Bethlehem Steel Company, Fore River Plant
SALEM
*Naumkeag Steam Cotton Co.
SOUTH BOSTON
American Sugar Refining Company, The
SOUTHBRIDGE
American Optical Company
*Ames Worsted Company
SPRINGFIELD
American Bosch Corporation
*Monsanto Chemical Company, Plastics Division
Moore Drop Forging Company
Westinghouse Electric & Manufacturing Company
WALPOLE
Lewis Mfg. Co., Division of The Kendall Company
WATERTOWN
Hood Rubber Company, Inc.
WEST LYNN
General Electric Company
Everett Foundry
River Works
West Lynn Plant
WORCESTER
American Steel & Wire Co.
Crompton & Knowles Loom Works
Graton & Knight Company
Norton Company
Whittall, M. J., Associates Inc.

MICHIGAN 53

BATTLE CREEK
Kellogg Company
BAY CITY
Chevrolet-Bay City, Division General Motors Corporation
CADILLAC
Goodrich, The B. F., Company
Cadillac Division
CENTER LINE
Chrysler Tank Arsenal
DEARBORN
Ford Motor Company
Highland Park Plant
River Rouge Plant
Lincoln Motor Car Company
DETROIT
American Brass Company, The
Budd, Edward G., Manufacturing Co.
Budd Wheel Company
Cadillac Motor Car Division General Motors Corporation
Chevrolet Forge, Division General Motors Corporation
Chevrolet-Gear & Axle, Division General Motors Corporation
Chevrolet Spring & Bumper, Division General Motors Corporation
Chrysler Corporation
Amplex Manufacturing Co.
Chrysler Kercheval Plant
Chrysler Main Plant
De Soto Division
Dodge Forge Division
Dodge Main Plant
Dodge Truck Plant
Plymouth Motor Corporation
Detroit Diesel Engine, Division General Motors Corporation
Detroit Edison Company, The
Fisher Body Detroit Division General Motors Corporation
Frederick Stearns & Company
Hudson, The J. L., Company
*Hudson Motor Car Company
*Kelsey-Hayes Wheel Company
Michigan Bell Telephone Co.
Packard Motor Car Company
Parke, Davis and Company
Ternstedt Manufacturing Division General Motors Corporation
*Timken-Detroit Axle Company
ECORSE
Great Lakes Steel Corporation
FLINT
AC Spark Plug Division General Motors Corporation
Chevrolet-Flint Division General Motors Corporation
du Pont, E. I., de Nemours & Company
Fisher Body Flint Division, Unit No. 1
Fisher Body Flint Division, Unit No. 2
General Motors Corporation
GRAND RAPIDS
American Seating Company
HIGHLAND PARK
Chrysler Motor Parts Corporation
JACKSON
*Reynolds Spring Company
*Sparks-Withington Company
LANSING
Fisher Body Lansing Division General Motors Corporation
Olds Motor Works, Division General Motors Corporation
*Reo Motor Car Company
MARYSVILLE
Chrysler Corporation, Parts Division
MIDLAND
Dow Chemical Company, The
MUSKEGON
Campbell, Wyant & Cannon Foundry Co.
PARCHMENT
*Kalamazoo Vegetable Parchment Co.
PORT HURON
Mueller Brass Co.
SAGINAW
Saginaw Malleable Iron Division General Motors Corporation

MINNESOTA 13

DULUTH
American Steel & Wire Co.
Universal Atlas Cement Co.
MINNEAPOLIS
Minneapolis-Moline Power Implement Company
Northwestern Bell Telephone Company
Pillsbury Flour Mills Company
*Sears, Roebuck & Co.
Washburn Crosby Co., Inc.
ST. PAUL
Great Northern Railway Co.
Montgomery Ward & Co.
Northern Pacific Railway Co.
*Waldorf Paper Products Co.
SOUTH ST. PAUL
*Armour and Company
*Swift & Company

MISSOURI 25

KANSAS CITY
Chevrolet Motor Division General Motors Corporation
Fisher Body Kansas City Division General Motors Corporation
*Ford Motor Company
Kansas City Power & Light Company
*Loose Wiles Biscuit Company
Montgomery Ward & Co.
Sears, Roebuck & Co.
Southwestern Bell Telephone Company
ST. LOUIS
Anheuser-Busch, Inc.
Brown Shoe Company
*Century Electric Company
Chevrolet Motor Company of St. Louis
Crunden Martin Manufacturing Co.
Famous-Barr Company, May Department Stores Co.
Fisher Body St. Louis Division General Motors Corporation
Ford Motor Company
International Shoe Co.
Mallinckrodt Chemical Works
Monsanto Chemical Works
Procter & Gamble Mfg. Co.
St. Louis Independent Packing Company
St. Louis-San Francisco Railway Company
Southwestern Bell Telephone Company
Stix, Baer & Fuller Company
SUGAR CREEK
Standard Oil Company

MONTANA 1

SUNBURST
The Texas Company

NEBRASKA 6

OMAHA
American Smelting & Refining Co.
Armour and Company
*Brandeis, J. L. & Sons
Northwestern Bell Telephone Company
Swift & Company
Union Pacific Railroad Co.

NEVADA 1

MCGILL
Nevada Consolidated Copper Corporation

NEW HAMPSHIRE 3

CLAREMONT
Sullivan Machinery Company
DOVER
Pacific Mills, Cocheco Division
MANCHESTER
International Shoe Co.

NEW JERSEY 60

ARLINGTON
du Pont, E. I., de Nemours & Company
Plastics Department
BAYONNE
Standard Oil Company of New Jersey
*Tide Water Oil Company
BAYWAY
Standard Oil Company of New Jersey
BLOOMFIELD
Chevrolet-Bloomfield, Division General Motors Corporation
General Electric Company
General Motors Parts Corporation
Westinghouse Electric & Manufacturing Company
BOUND BROOK
*Bakelite Corporation
Calco Chemical Company, Inc.
BURLINGTON
*Devlin, Thomas, Mfg. Co.
CAMDEN
Campbell Soup Company
Evans, John R. & Company
RCA Manufacturing Company, Inc.
CARTERET
United States Metals Refining Co.
DELAIR
Kieckhefer Container Company
EDGEWATER
Ford Motor Company
National Sugar Refining Co. of New Jersey, The
ELIZABETH
Diehl Manufacturing Company
Singer Manufacturing Co., The
FAIRVIEW
Bellman Brook Bleachery Co.
FRANKLIN
New Jersey Zinc Company, The
GRASSELLI
du Pont, E. I., de Nemours & Company, Grasselli Chemical Department
General Aniline Works
HARRISON
*Driver-Harris Co.
Hyatt Bearings Division General Motors Corporation
HOBOKEN
Bethlehem Steel Company
JERSEY CITY
American Can Company
Hudson Factory
*Armour and Company
Standard Oil Company of New Jersey
Swift & Company
KEARNY
Western Electric Company
LINDEN
American Cyanamid Company
MANVILLE
Johns-Manville Corporation
MILLVILLE
*Millville Manufacturing Co.
NEWARK
*American Can Company
Bamberger, L., & Co.
Clark Thread Company, The
*Hollander, A., & Son, Inc.
New Jersey Bell Telephone Co.
Prudential Insurance Company of America, The
Westinghouse Electric & Manufacturing Company
NEW BRUNSWICK
Johnson & Johnson
ORANGE
Monroe Calculating Machine Co.
PARLIN
du Pont Film Manufacturing Corporation
du Pont, E. I., de Nemours & Company, Parlin Plant
PASSAIC
Manhattan Rubber Mfg. Division, The Raybestos-Manhattan, Inc.
United States Rubber Products, Inc.
PATERSON
Wright Aeronautical Corporation
PAULSBORO
Socony-Vacuum Oil Company, Inc.
PENNS GROVE
du Pont, E. I., de Nemours & Company Dye Works
PERTH AMBOY
American Smelting & Refining Co.
*General Cable Corporation
*International Smelting & Refining Co.
Raritan Copper Works
POMPTON LAKES
du Pont, E. I., de Nemours & Company
RAHWAY
Merck & Co., Inc.
ROEBLING
John A. Roebling's Sons Co.
TRENTON
John A. Roebling's Sons Co.
Sloane-Blabon Corporation
*Thermoid Company, The

NEW YORK 135

ALBANY
A. P. W. Paper Co.
Huyck, F. C., & Sons, Kenwood Mills
Montgomery Ward & Co.
New York Power & Light Corporation
AMSTERDAM
Bigelow-Sanford Carpet Co., Inc.
Mohawk Carpet Mills
AUBURN
International Harvester Co.
BINGHAMPTON
Agfa Ansco Division General Aniline Film Corporation
BROOKLYN
American Can Company
American Manufacturing Co.
American Sugar Refining Company, The
Atlantic & Pacific Tea Co.
Brooklyn Roasting Plant
Bethlehem Steel Company, Shipbuilding Division
Boorum & Pease Company
Chelsea Fibre Mills
Eberhard Faber Pencil Co.
Kirkman & Son, Inc.
New York Telephone Company
Quaker Maid Company, Inc.
Factory No. 1
Sperry Gyroscope Company, Inc.
Squibb, E. R., & Sons
BUFFALO
American Brass Company, The
American Radiator Company

*Buffalo Forge Company
*Buffalo Niagara Electric Corp.
Chevrolet-Motor & Axle Division General Motors Corporation
Chevrolet Motor Company of Buffalo
*Curtiss Aeroplane & Motor Company, Inc.
Dold, Jacob, Packing Co.
*Dunlop Tire and Rubber Co.
du Pont, E. I., de Nemours & Company
Fedders Manufacturing Co., Incorporated
Fisher Body Company, Division General Motors Corporation
Ford Motor Company
Houde Engineering Corporation, Division Houdaille-Hershey Corporation
Larkin Co., Inc.
National Aniline & Chemical Company, Incorporated
National Biscuit Company
New York City Transit System Brooklyn-Manhattan Transit Division
New York Telephone Company
Pillsbury Flour Mills Company
Republic Steel Corporation
Washburn Crosby Co.
Worthington Pump & Machinery Corporation

CORNING
Corning Glass Works

CORTLAND
*Wickwire Brothers

ENDICOTT
Endicott Johnson Corporation
International Business Machines Corporation

GARDEN CITY
*Country Life Press Corporation

HASTINGS-ON-HUDSON
Anaconda Wire & Cable Co.

ILION
Remington Arms Company, Inc.

JAMESTOWN
Art Metal Construction Co.

LACKAWANNA
Bethlehem Steel Company

LAUREL HILL, L. I.
Phelps Dodge Refining Corp.

LONG ISLAND CITY
Macy, R. H., Co., Inc.
National Sugar Refining Company, The

MARINERS HARBOR, S. I.
Procter & Gamble Mfg. Company, The

NEWBURGH
du Pont, E. I., de Nemours & Company

NEW YORK
American Telephone & Telegraph Company
Bankers Trust Company
Bell Telephone Laboratories
Bloomingdale's
Consolidated Edison Company of New York, and Affiliated Companies
Coty, Inc.
Employers Liability Assurance Corp. Ltd., The
Equitable Life Assurance Society of the United States
Federal Reserve Bank of New York
*Gimbel Brothers
*Heide, Henry, Inc.
Horn & Hardart Company, The
Interborough Rapid Transit Co.
International Telephone & Telegraph Corporation
Long Island Railroad Company
Macy, R. H., & Co., Inc.
Metropolitan Life Insurance Co.
Montgomery Ward & Co.
Morgan, J. P., & Co. Incorporated
National Biscuit Company
National City Bank of New York, The
Navy Yard
New York Central Lines
New York Edison Company
New York Life Insurance Co.
New York Stock Exchange
New York Telephone Company
New York Times, The
News Syndicate Co., Inc.
*Paramount Pictures Distributing Corporation
*Paramount Productions, Inc.
*Southern Pacific Steamship Lines
Squibb, E. R., & Sons
Standard Oil Company (Incorporated in New Jersey)
Standard Oil Company of New Jersey
Stern Brothers
Stewart's Cafeterias, Inc.
*Third Avenue Railway System
*United Dressed Beef Company
United Fruit Company
*Wanamaker, John
*Washburn Wire Co., Inc.
Western Electric Company
195 Broadway
395 Hudson St.
Wilson & Co., Inc.

NIAGARA FALLS
Carborundum Company, The
Defiance Paper Co.
du Pont, E. I., de Nemours & Company, R. & H. Chemicals Department
National Biscuit Company Shredded Wheat Bakery
National Carbon Company, Inc.
Niagara Falls Power Company
Union Carbide Company

NORTH TARRYTOWN
Chevrolet-Tarrytown Division General Motors Corporation
Fisher Body Tarrytown Division General Motors Corporation

OZONE PARK, L. I.
*Kops Brothers, Inc.

RENSSELAER
General Aniline Works, Inc.

ROCHESTER
American Laundry Machine Company, The
Bausch & Lomb Optical Co.
Delco Appliance Corporation
Eastman Kodak Company
*General Railway Signal Co.
Ritter Dental Manufacturing Company, Inc.
Stromberg-Carlson Telephone Manufacturing Company
Taylor Instrument Companies

ROME
General Cable Corporation
Revere Copper & Brass Incorporated

SCHENECTADY
American Locomotive Co.
General Electric Company

SOLVAY
Solvay Process Company, The

SYRACUSE
Brown-Lipe-Chapin Company, Division General Motors Corporation
Crouse-Hinds Company
Halcomb Steel Company
*Syracuse Chilled Plow Co., Inc.
United States Hoffman Machinery Corporation

TROY
Cluett, Peabody & Co., Inc.

UTICA
*Skenandoa Rayon Corporation

YONKERS
Otis Elevator Company

NORTH CAROLINA 3

GASTONIA
*Firestone Cotton Mills, Inc.

WILMINGTON
Atlantic Coast Line Railroad Company

WINSTON-SALEM
Reynolds, R. J., Tobacco Co.

OHIO 66

AKRON
Firestone Tire & Rubber Company, The
Goodrich, The B. F., Company
Goodyear Tire & Rubber Co.

CANTON
Hercules Motors Corporation
Republic Steel Corporation
*Timken Roller Bearing Co., The

CINCINNATI
American Can Company
Cincinnati & Suburban Bell Telephone Co., The
Cincinnati Milling Machine & Cincinnati Grinders Inc.
Container Corporation of America
Crosley Corporation, The

CLEVELAND
*Addressograph-Multigraph Corporation
Aluminum Company of America
Cleveland Electric Illuminating Co., The
Cleveland Railway Co., The
du Pont, E. I., de Nemours & Company, Grasselli Chemicals Department
Erie Railroad Company
Fisher Body Cleveland Division General Motors Corporation
General Electric Company Incandescent Lamp Department
Glidden Company, The
Halle Bros. Co., The
May Company, The
National Acme Company, The
National Carbon Company, Inc.
National Malleable & Steel Castings Company
Otis Steel Company
Perfection Stove Company
Republic Steel Corporation
Standard Oil Company, The (An Ohio Corporation)
Standard Tool Co., The
Westinghouse Electric & Manufacturing Company
White Motor Company, The
White Sewing Machine Corporation
Willard Storage Battery Co.

COLUMBUS
Buckeye Steel Castings Co.
Federal Glass Co.
Jeffrey Manufacturing Co.
Owens-Illinois Glass Company

DAYTON
Airtemp Division-Chrysler Corporation
Delco Products Division General Motors Corporation
Frigidaire Division General Motors Corporation
National Cash Register Company, The

HAMILTON
Champion Paper & Fibre Company, The
Ford Motor Company

IVORYDALE
Procter & Gamble Co., The

MASSILLON
Republic Steel Corporation

MIDDLETOWN
American Rolling Mill Co., The

NILES
Niles Rolling Mill Co., The

NORWOOD
Chevrolet-Norwood Division General Motors Corporation
Fisher Body, Norwood Division General Motors Corporation
United States Playing Card Company, The

PORTSMOUTH
Wheeling Steel Corporation

TOLEDO
American Can Company
Chevrolet-Toledo, Division General Motors Corporation
Community Traction Co., The
Interlake Iron Corporation
Libbey Glass Company
Spicer Manufacturing Corporation
Toledo Edison Company, The

WARREN
Youngstown Pressed Steel Division, The, Mullins Manufacturing Corporation

YOUNGSTOWN
Carnegie-Illinois Steel Corporation
General Fireproofing Co., The
Republic Rubber Company, The
Republic Steel Corporation
Truscon Steel Company
Youngstown Sheet & Tube Company, The

OKLAHOMA 9

BARTLESVILLE
Phillips Petroleum Company

OKLAHOMA CITY
Armour and Company
Wilson & Co., Inc. of Oklahoma

PONCA CITY
Continental Oil Company

TULSA
Carter Oil Company, The
Mid-Continent Petroleum Corporation
*Sinclair Prairie Oil Company
Texas Company, The
Tulsa City Lines, Inc.

OREGON 5

PORTLAND
Montgomery Ward & Co.
Portland Electric Power Co.
*Portland Gas & Coke Company
Portland General Electric Co.
Portland Traction Company

PENNSYLVANIA 113

ALIQUIPPA
Jones & Laughlin Steel Corporation

ALLENPORT
Pittsburgh Steel Company

ALLENTOWN
Lehigh Portland Cement Co.
Ormrod Plant
Fogelsville Plant

AMBRIDGE
American Bridge Company
Byers, A. M., Company
*National Electric Products Corporation

BEAVER FALLS
*Babcock & Wilcox Tube Co.

BETHLEHEM
Bethlehem Steel Company

BLOOMSBURG
*Magee Carpet Co., The

BRACKENRIDGE
Allegheny Steel Company

BURNHAM
Standard Steel Works Division, Baldwin Locomotive Works

BUTLER
American Rolling Mill Co., The

CHESTER
Aberfoyle Manufacturing Co.
Ford Motor Company
Scott Paper Company
*Sun Shipbuilding & Dry Dock Company

CLAIRTON
Carnegie-Illinois Steel Corporation

COATESVILLE
Bethlehem Steel Company
Lukens Steel Company

CREIGHTON
Pittsburgh Plate Glass Co.

DUQUESNE
Carnegie-Illinois Steel Corporation

EAST LIBERTY
National Biscuit Company

EASTON
*Individual Drinking Cup Co.

EAST PITTSBURGH
Westinghouse Electric & Manufacturing Company

EDDYSTONE
*Baldwin Locomotive Works
*Baldwin-Southwark Corporation
*General Steel Castings Corporation

ELLWOOD CITY
*National Tube Company

ERIE
*Erie Malleable Iron Co.
General Electric Company
Hammermill Paper Company
Standard Stoker Company, Inc.

ETNA
Spang, Chalfant & Co., Inc.

FARRELL
Carnegie-Illinois Steel Corporation

FORD CITY
*Pittsburgh Plate Glass Company

HERSHEY
*Hershey Chocolate Corporation

JOHNSTOWN
Bethlehem Steel Company
Industrial Collieries Corporation

KINGSTON
*General Cigar Co., Inc.

LANCASTER
Armstrong Cork Company

LEBANON
Bethlehem Steel Company
LEETSDALE
Bethlehem Steel Company
LESTER
Westinghouse Electric & Manufacturing Company
MARCUS HOOK
American Viscose Corporation
*Sinclair Refining Company
Sun Oil Company
MCKEESPORT
McKeesport Tin Plate Co.
National Tube Company
MEADVILLE
American Viscose Corporation
Talon, Inc.
MIDLAND
Pittsburgh Crucible Steel Co.
MONESSEN
Pittsburgh Steel Company
MUSE
National Mining Company
NEW KENSINGTON
Aluminum Company of America
PALMERTON
New Jersey Zinc Co. (of Pa.)
PENCOYD
American Bridge Company
PHILADELPHIA
Abbotts Dairies, Inc.
Atlantic Refining Co., The
Bayuk Cigars, Inc.
Bell Telephone Company of Pennsylvania, The
Brill, The J. G., Company
Collins & Aikman Corporation
Curtis Publishing Company, The
Disston, Henry, & Sons, Inc.
du Pont, E. I., de Nemours & Company
du Pont, E. I., de Nemours & Company, Grasselli Chemical Department
*Evening Bulletin, The
*Franklin Sugar Refining Company, The
General Electric Company
Gimbel Brothers
Horn & Hardart Baking Co.
Link-Belt Company
National Biscuit Company
Navy Yard
Pennsylvania Railroad Co., The
Philadelphia Gas Works Co.
Philadelphia Rapid Transit Co.
Reading Company
Sears, Roebuck & Co.
Sharp & Dohme
Stetson, John B., Company
Surpass Leather Co.
United Gas Improvement Company, The
Wanamaker, John, Philadelphia
*Western Electric Company
Whitman, Stephen F., & Son, Inc.
PITTSBURGH
Bell Telephone Company of Pennsylvania, The
Byers, A. M., Company
Carnegie-Illinois Steel Corporation
Edgar Thompson Works
Homestead Works
Heinz, H. J., Company
Jones & Laughlin Steel Corporation
Philadelphia Company
Pittsburgh Coal Co.
Montour Mine No. 10
*Pittsburgh Screw & Bolt Corporation
RANKIN
Bethlehem Steel Company
Carnegie-Illinois Steel Corporation
READING
Reading Iron Company
Textile Industries of Wyomissing
SAYRE
Lehigh Valley Railroad Co.
SCRANTON
Glen Alden Coal Company
Hudson Coal Company, The
Pennsylvania Coal Company
SHARON
*National Malleable & Steel Castings Company
Sharon Steel Corporation
*Westinghouse Electric & Manufacturing Company
STEELTON
Bethlehem Steel Company
SWISSVALE
Union Switch & Signal Co.
VANDERGRIFT
*American Sheet & Tin Plate Co.
WILKES-BARRE
Lehigh Valley Coal Co., The
WILMERDING
Westinghouse Air Brake Co.
YORK
York Ice Machinery Corporation

RHODE ISLAND 12

PAWTUCKET
Coats, J. & P., (R.I.) Inc.
Lorraine Manufacturing Co.
PROVIDENCE
American Screw Company
*Brown & Sharpe Mfg. Company
Builders Iron Foundry
Davol Rubber Company
Gorham Manufacturing Co.
New England Telephone & Telegraph Company
U. S. Finishing Company, The
United States Rubber Company
Wanskuck Mills
SAYLESVILLE
Sayles Finishing Plants, Inc.

SOUTH CAROLINA 2

CHARLESTON
Standard Oil Company of New Jersey
United States Navy Yard

SOUTH DAKOTA 1

LEAD
*Homestake Mining Company

TENNESSEE 4

KINGSPORT
Tennessee Eastman Corporation
MEMPHIS
*Ford Motor Company
*Sears, Roebuck and Co.
OLD HICKORY
du Pont, E. I., de Nemours & Company

TEXAS 22

BAYTOWN
Humble Oil & Refining Co.
BEAUMONT
Magnolia Petroleum Company
CORPUS CHRISTI
Southern Alkali Corporation
DALLAS
*Ford Motor Company
Southwestern Bell Telephone Company
Texas Company, The
EL PASO
*Nichols Copper Company
FORT WORTH
Armour and Company
Montgomery Ward & Co.
Swift & Company
HOUSTON
Humble Oil & Refining Co.
Shell Petroleum Corporation
Sinclair Refining Company
Texas Company, The
Texas & New Orleans R.R. Co.
INGLESIDE
Humble Oil & Refining Co.
NEW GULF
*Texas Gulf Sulphur Company
PORT ARTHUR
Gulf Oil Corporation
Texaco Can Company, The
Texas Company, The
Port Arthur Terminal
Port Arthur Works
Port Neches Works

UTAH 4

PROVO
Columbia Steel Company
SALT LAKE CITY
American Smelting & Refining Co.
U. S. Smelting, Refining & Mining Co.
Utah Copper Company

VERMONT 3

RUTLAND
Rutland Railroad Company
ST. JOHNSBURY
Fairbanks, Morse & Co.
Fairbanks Scale Division
WINOOSKI
American Woolen Company, Champlain Mills

VIRGINIA 11

DANVILLE
Riverside & Dan River Cotton Mills
FORDWICK
Lehigh Portland Cement Co.
NEWPORT NEWS
Newport News Shipbuilding & Dry Dock Company
NORFOLK
Ford Motor Company
PORTSMOUTH
Norfolk Navy Yard
RICHMOND
American Suppliers, Inc.
American Tobacco Company
Richmond Branch
Virginia Branch
du Pont, E. I., de Nemours & Company
ROANOKE
*American Viscose Corporation
Norfolk and Western Railway

WASHINGTON 3

BREMERTON
Puget Sound Navy Yard
SEATTLE
Frederick & Nelson
TACOMA
American Smelting & Refining

WEST VIRGINIA 9

BELLE
du Pont, E. I., de Nemours & Company
CHARLESTON
Libbey-Owens-Ford Glass Co.
CLARKSBURG
Weirton Steel Company
GARY
United States Coal & Coke Co.
HUNTINGTON
International Nickel Company, Inc., The
MARTINSBURG
*Interwoven Stocking Company
PARKERSBURG
American Viscose Corporation
SOUTH CHARLESTON
Carbide & Carbon Chemicals Corporation
WEIRTON
Weirton Steel Company

WISCONSIN 12

BELOIT
Fairbanks, Morse & Co.
CUDAHY
Cudahy Brothers Company
JANESVILLE
Chevrolet Motor Company of Wisconsin
General Motors Corporation
Fisher Body Janesville Division
General Motors Corporation
KOHLER
Kohler Co.
MILWAUKEE
*Bucyrus-Erie Company
Cutler-Hammer Inc.
Globe Union Mfg. Company
International Harvester Co.
*Plankinton Packing Co.
Smith, A. O., Corporation
RACINE
Case, J. I., Company

WYOMING 1

CASPER
Standard Oil Company (Indiana)

CANADA

ALBERTA 3

CALGARY
Hudson's Bay Company, Ltd.
EDMONTON
Hudson's Bay Co., Ltd.
*Swift Canadian Co., Ltd.

MANITOBA 3

ST. BONIFACE
Canada Packers, Ltd.
WINNIPEG
Hudson's Bay Company
Swift Canadian Co., Ltd.

ONTARIO 10

HAMILTON
*Procter & Gamble Company of Canada, Ltd., The
Steel Company of Canada, Ltd.
NEW TORONTO
Anaconda American Brass, Ltd.
NIAGARA FALLS
North American Cyanamid Limited
OSHAWA
General Motors of Canada, Limited
TORONTO
Swift Canadian Co., Ltd.
WINDSOR
*Chrysler Corporation of Canada, Limited
*Dominion Forge & Stamping Company
Ford Motor Company of Canada, Limited
General Motors of Canada, Limited

QUEBEC 2

MONTREAL
Canadian National Railways
Steel Company of Canada, Limited

A Medical Care Plan

THE medical service of American Cast Iron Pipe Company, employing 1500 persons, has three full-time physicians, a laboratory and x-ray technician, two dentists, 12 part-time specialists, and two full-time nurses. Medical service is free to all employees and their families, at a cost to the company of $125,000 a year. In 1940, 73,017 distinct services were rendered. In addition, a study of cold vaccines was made, with 500 employees cooperating. Thorough pre-employment examinations are given. The loss of man days through illness during 1940 was 0.87%, and through accident 0.73%. The company feels that the working efficiency of the employees is increased to such an extent that more money is saved than the total cost of the medical services.

—From an article by C. B. BRAY, in *Medical Care*, 1:344-349.

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Medical Counselor

IF ITS three years of operation are criterion of the future, *Chicago Tribune's* medical counsel service, established at the beginning of 1939, is entering its fourth successful year. Editorially it is summarized:

"Good health is a difficult thing to set down on a balance sheet, but *The Tribune* feels that the service has more than repaid its cost to the company. . . . It is recommended to other employers who are alert to assist their employees in obtaining benefits as a group which they may find it difficult in obtaining as individuals. . . . It was established because it came to the attention of the company that on too frequent occasions employees suffered from failure to find the right physician for their particular illnesses, or, in some rarer cases, were victimized financially or physically by excessive fees or improper diagnosis."

In the nature of things a newspaper's achievements are in line for being told about. It is right and proper that they should be, for newspapers have a function of leadership, and when they do a job as commendable as this their example is entitled to be well publicized. But it should be noted that there are hundreds of other concerns (see pp. 79-84) which are not in position to call attention generally to their similar activities. And it should also be noted that medical counsel has always been recognized as one of the clear-cut functions of an industrial medical service, and for many years and in many places has been freely and effectively given. Not every company has a man of DR. CUTTER's standing and ability to offer advice, but the employees of other companies who have any of the benefits of medical service have also the benefit of medical counsel which is uniformly high class. If there is anything more to be desired of such service in general as it is expressed in well over a thousand employment situations today, it is only that the consultation and advice are not more freely sought and more carefully followed.

"Keep 'Em Working!"

INDUSTRIAL physicians and surgeons are capable men. They have to be, if they want to remain industrial physicians and surgeons. The eyes upon their work are many, and the interest in its results is vastly more than the sole and personal concern of the patient. The reason is, of course, that every individual under their professional observation must be viewed with relation to his or her place as an economic unit of production—for profit in normal times, for victory in war time. This requires the medical interest in each of them to be as keen and alert in health as in sickness; the employee, by virtue of being an employee, is a patient as completely at one time as another—"in sickness or in health," and equally in both. The professional relation, expanded in industrial sickness to embrace the employer, is further expanded in industrial health to include the employee's general welfare—with the emphasis on the "well."

This concept is right now at its highest and most important exemplification, in that the identities of all employers has been merged into the one identity of the nation. The problems of each, under national stress, are the problems of all; the separate third parties to the physician-employee relation have become a single great, overwhelming, driving third party, the need for victory. The United States in travail is the one employer of physician and employee alike. There is no time for employee sickness; the "well" is as much the challenge to medicine now as the "ill" ever was in times past.

UNKNOWN to themselves, unconsciously in their objective development, the pioneers of industrial medicine must have foreseen this tremendous apotheosis of their chosen field. For they builded well; they laid the strong foundation upon which the superstructure of ability on the part of industrial medicine to rise to the national emergency is being now so gloriously uplifted. It is owing to them that industrial medicine, which was a mere beginning entity at the opening of the last war, is a highly developed science at the country's service in this one—so highly developed, indeed, that the new problems of new conditions are not only being quickly met and solved but are even being anticipated, the added hazard and the means of its control arriving together. And back of that, it is also owing to them that where the new in methods of prevention and treatment is merely the extension of the old, there is the old to extend.

Most of the pioneers have been spared—to put the capstones of still more fine achievements on careers already full of them. They are doing what needs to be done, and doing it effectively. From long acquaintance with these men—and those who have come, in recent months, to stand shoulder-to-shoulder with them—we are confident that the job among the millions engaged in our all-out war effort, to *"keep 'em working,"* is eminently in good hands. More power to them!

++++++++++++++++++++++++++++++

Why your Red Cross urgently needs

FIFTY MILLION DOLLARS, NOW

How the fund is allocated . . .
What it does in service

Every dollar that you give now to your Red Cross marches into the thick of things where humanitarian help is needed most—up to the fronts and battle stations where the fighting is heaviest. Into the Red Cross hospitals and First Aid units where prompt medical attention and supplies may save innumerable lives. And throughout our broad land to train and equip volunteers to meet any emergency that may strike.

How the $50,000,000 War Fund is Used

SERVICE TO THE ARMED FORCES $25,000,000

Provides for the care, welfare and morale of the Army and Navy, including services to men in hospitals and during convalescense. • Provides an important link between the service men and their families; keeps the families from breaking up, supplies food, shelter, medicine, and even jobs where necessary. • Provides essential medical and other supplies outside of standard Government equipment. • Operates Red Cross headquarters at camps and naval stations. • Enrolls blood donors and medical technologists for Army and Navy needs. • Provides millions of surgical dressings, sweaters, socks, etc. through volunteer workers.

DISASTER AND CIVILIAN EMERGENCY RELIEF . . $10,000,000

Supplies emergency needs for food, clothing, shelter and medical attention for disaster victims. • Assists stricken families in repair of homes and other adjustments; provides minimum reserves of essential relief supplies to prevent unnecessary delays.

CIVILIAN DEFENSE SERVICES . . . . . $ 5,000,000

Trains volunteers for home nursing and nurses' aides. • Trains nurses, men and women, for active duty with the Army and Navy. • Trains volunteers in First Aid and accident prevention. • Trains volunteers for work in Motor Corps, Canteen and Production. • Instructs men, women and children in preparedness against explosive and incendiary bombs. • Organizes for evacuation of children and their families from stricken areas. • Assists Red Cross chapters in establishing effective coordination of emergency relief with local and State defense authorities.

SERVICE AND ASSISTANCE THROUGH CHAPTERS . $ 4,000,000

Gives assistance and service to the 3,740 Red Cross Chapters with their 6,131 Branches responsible for local Red Cross activities, particularly welfare work among the service men and their families.

OTHER ACTIVITIES AND CONTINGENCIES . . . . $ 6,000,000

Provides for unforeseen expansions in program and for new activities made necessary by unexpected developments.

TOTAL $50,000,000

THE AMERICAN RED CROSS $50,000,000 WAR FUND

Note to Red Cross Canvassers: "Use this material the better to inform contributors how their donations are being expended."

This Page is donated by INDUSTRIAL MEDICINE.

NEW BOOKS

Industrial Eye Hazards

Review by
C. O. SAPPINGTON, M.D., DR.P.H.

EYE HAZARDS IN INDUSTRY—EXTENT, CAUSE, AND MEANS OF PREVENTION. LOUIS RESNICK. Cloth, 321 pages. Price $3.50. Published for the National Society for the Prevention of Blindness by Columbia University Press, New York, 1941.

IF STATISTICAL figures are necessary to convince physicians, safety directors, nurses, and industrial managers that eye injuries should be prevented, the facts are numerous: Every 30 seconds throughout every single working day an American workingman sustains an eye injury; every day of the working year 26,880 workers are idle because of eye injuries; 100 workers have unnecessarily lost the sight of both eyes and 1000 more have needlessly lost the sight of one eye at the end of every working year; the cost to industry is $100,000,000 annually, although only 20% of eye injuries are compensable.

Ironically, there is no need for the blinding of any worker in American industry—the causes of industrial accidents and diseases affecting the eyes are now known, and methods of eliminating hazards or of protecting workers have been thoroughly demonstrated. Moreover, devices to protect the worker against every type of eye accidents are now available.

The untimely death of the author of this book, LOUIS RESNICK, fortunately did not prevent its completion and publication. In spite of a lingering illness, he worked faithfully to finish the volume and just three days before his death completed the manuscript which represented more than 20 years of staff association with many organizations concerned with sight conservation and safety in industry.

SALT LOSS CAUSES
HEAT FAG
WORKERS WHO Sweat NEED Salt
• USE MORTON'S SALT TABLETS •
Morton Salt Co., Chicago, Illinois

It is of especial interest to know that the author's contacts were not confined to "swivel chair tactics," but he visited many factories, mills, mines, shops, utilities and other places throughout the country, obtaining first-hand observations of the problem, the need for preventive activities, and the great losses sustained.

The material is divided into two parts, the first on the problem (hazards, accidents, diseases, defective vision, and first aid) and the second on the solution (mechanical guards, process revision, proper lighting, education, and administrative supervision). There are four appendices, containing a self-appraisal form for eye safety in industry; industrial poisons which are hazardous to the eyes; recommended minimum standards for illumination of industrial interiors, and a list of national organizations concerned with industrial welfare. An excellent bibliography of approximately 200 references adds value to the text, as does the well-prepared index, the use of the tables, graphs and illustrations. These pictures have been secured from representative industries where excellent programs of eye protection are in effect: Delaware & Hudson R. R. Co., American Optical Co., Caterpillar Tractor Co., Eastern Gas & Fuel Associates, the Pullman Company, Union Health Center, the Austin Co., American Standards Association, Westinghouse Electric & Mfg. Co., Monarch Machine Tool Co., Chicago Journal of Commerce, Ford Motor Co., General Electric Co., St. Joseph Lead Co., U. S. Steel Corp., and the Courtesy Center for Safety Education, New York University. *—Continued on page 88*

Effective, Convenient and Economical

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EYE HAZARDS IN INDUSTRY

Extent, Cause, and Means of Prevention

By Louis Resnick

"This book should prove particularly valuable now that the conservation of the eyes of American working men is as vital to national defense as the building of armament and the training of men to use defense equipment."—*Health News.*

". . . the book does not stop with presenting the grim picture of lost eyesight in industry and its cost to both the company and the accident victim. Much space is given to practical methods of eye protection and the experience of some of the leading industries."—*National Safety News.*

320 pages $3.50

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NEW YORK

No book should be judged on size alone. In this little volume there is perhaps more helpful and practical information than has ever been put between two covers on the subject of eye hazards in industry. It should be useful to anyone who has either direct or indirect responsibility for the conservation of eyesight in American industry.

INDUSTRIAL HEALTH AND DISEASE

Cutting Oil Sanitation

DR. NICHOLAS D. DUFFETT
Bacteriologist, C. B. Dolge Company, Westport, Connecticut

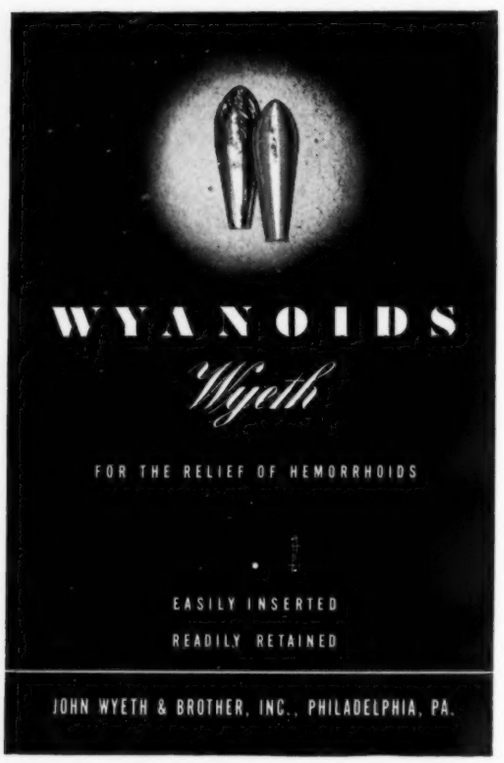
THE past generation has made amazing progress in raising sanitary standards in industrial establishments. The introduction of change houses, washing and shower facilities, company cafeterias, etc., has developed in employes a new consciousness of their working environment. Machinists have always had a natural tendency to blame any skin eruption upon cutting oils wherever these have been in use and this tendency has increased in the vastly expanded metal cutting industries. While some medical opinion seems to be that there is not too much basis for the assumption that soluble cutting oils are the cause of any considerable amount of dermatitis still it is very hard to convince any worker of this, particularly if the cutting oil is "blue" or obviously dirty. Even though the risk of serious contagion is not great, nevertheless the employee has a right to be supplied with a material that is reasonably clean, free from foul odors and safe to use. A putrescent oil solution containing several million bacteria per cubic centimeter, no matter whether the bacteria can be classed as harmless or not is certainly not a clean, uncontaminated material. It is a known fact that the mere presence of large numbers of bacteria in a solution even though they may be of a harmless variety, influences compensation cases because of the implication of negligence in permitting workmen to use obviously contaminated material.

For any suddenly crowded machine shop, struggling to maintain an exacting production schedule, the simple, sensible thing to do is to make a survey of the condition of the solution in use. Samples should be collected in sterile bottles and forwarded to a bacteriologist for examination. This procedure is inexpensive and an experienced bacteriologist in counting the number of organisms present will quickly spot anything unusual. If the report is reassuring, you can be confident that your present method of handling is adequate from a sanitary viewpoint. You also have something to bank on to combat suspicion of the oil as a source of "oil pimples," oil dermatitis, or what not. You have protected yourself against the appearance of negligence.

Where considerable numbers of bacteria are found, simple hygienic methods are available which will lower the number to any limits considered necessary.

A few susceptible individuals who continually complain of trouble from cutting oils can be given protective ointments to use. The success of such protective creams depends entirely upon the amount of cooperation on the part of the worker. Such creams will not give complete protection but if applied carefully and used faithfully will be very helpful in most cases.

From *Connecticut Industry*, October, 1941.



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IN BURNS · SKIN INJURIES

Forms a soft eschar, protects against air and bacteria, relieves pain.

Valuable for first aid and after-care in painful, pruritic, infectious dermatologic lesions.

Send for trial tube.

THE E. L. PATCH COMPANY
BOSTON, MASS.

Such measures, however, can scarcely be used throughout the whole shop and the heart of the problem lies in keeping the circulating solution practically free from bacteria of any kind.

Cutting oils can be readily pasteurized. All of the micro-organisms likely to be present, both pathogenic and non-pathogenic have a low thermal death point. Maintaining cutting oil solutions at 140-160° for 30 minutes is ample for the purpose. It must be pointed out that the entire body of oil solution must be held at that temperature for the period indicated. There have been many instances where sterilizers have been installed and through careless operation have entirely failed of their purpose. While pasteurization can yield a germ free oil, still, every pipe leading to and from the central sterilizing tank and every pump and catch tray on each machine contains contaminated oil ready to inoculate the circulating solution at once with the very organisms you have been at pains to destroy. Further, in smaller shops where closed circuit pumping of oil solution is practiced on individual machines such sterilization is impossible or at least impracticable.

The addition of competent chemical disinfectants to the oil solution is the best way to maintain continual uniform low bacterial counts. Any dissatisfaction with this method of control in the past has always arisen from the choice of an unsuitable disinfectant. Carbolic and coal tar disinfectants so often used will perhaps do little more than flavor the air of the machine shop with the odor of carbolic acid. When used in proportions that are effective the odor may be so strong as to be intolerable. We have examined samples containing such disinfectants, where the coal tar odor has been a continual cause of complaint and found counts running into the millions. In one instance after examination the sample was set aside for three weeks and then re-examined. It still contained 50,000 bacteria per cubic centimeter, about the same number that would have been present had there been no germicide present, for bacteria will ultimately die in such solutions for lack of food. It is clear that germicides sold for general use may be of little value for this particular purpose. There is no justification for buying cutting oil disinfectants on the basis of "phenol coefficient." The phenol coefficient is simply a yard stick for comparing the strength of phenolic disinfectants when used for common germicidal purposes. It is positively not to be used as a basis for purchase for specific special uses. For example, if you wish to purchase a disinfectant for use in workmen's eyes, you wouldn't be interested in the phenol coefficient, because that wouldn't tell if the material were safe to use or its value as an eye lotion. It won't help in selecting a disinfectant for cutting oil solutions either.

Purulent drainage and exudation usually produce severe maceration of adjacent skin areas accompanied by intense itching. Since the desire to scratch cannot always be suppressed, traumatic lesions are apt to complicate the original wound. Applied directly onto the involved skin, Calmitol Ointment controls the tormenting pruritus, and encourages local rest. Furthermore, through the protective and drying action of its zinc oxide - lanolin - petrolatum base, it aids in preventing further maceration.

Calmitol Ointment is also widely employed for its specific antipruritic properties in contact dermatites, food and drug eruptions, eczema, urticaria, ringworm, and pruritus vulvae, scroti, and ani.

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Calmitol contains chlor-iodo-camphoric aldehyde, levo-hyoscine oleinate, and menthol, in an alcohol-chloroform-ether vehicle. Pruritus is controlled through its blocking action upon cutaneous receptor organs and nerve endings. Calmitol is protective, bacteriostatic, and induces mild active hyperemia which aids in disposal of toxins.

CALMITOL THE DEPENDABLE ANTI-PRURITIC

A prime requisite of a cutting oil disinfectant is that prolonged contacf shall be without any irritating effect on the skin. It must not interfere with the wetting or cooling properties of the oil solution with which it is used. It should have no decided odor. It must not break the oil emulsion on long standing. It must not affect metals. The ultimate test is, of course, that it will keep the circulating solution practically germ free in *your brand of cutting oil in YOUR SHOP UNDER YOUR CONDITIONS OF USE.* The only way that this can be determined is by a bacteriological test. It is folly to purchase or use a disinfectant without checking up to see if it is doing the job.

A disinfectant labelled as useful for cuts, wounds, disinfecting garbage pails, sick rooms and cutting oils is probably not as useful for cutting oils as one specifically designed for that use and not advertised for other purposes. A recommended procedure is this:

First, arrange to have a bacteriological examination made of some samples from the plant. Select old material or solution most likely to be contaminated. You want to know the worst. If the report shows need for further hygienic measures, then contact a manufacturer of cutting oil disinfectants who actually operates a bacteriological laboratory and who can check samples from your plant occasionally so long as you are using their disinfectant. Have their man look over your problem and accept his recommendations. The cost of proper control is surprisingly small. If you put the problem in competent hands you will have no more worry on that score and you will save money in the long run.

America's

health army is mobilized!

INTO THE SPOTLIGHT today comes the work of nearly two million people engaged directly or indirectly in caring for the sick and preventing disease. For America now realizes that as vital as arms and munitions to the nation's defense is the *health of its people.*

Behind those of America's Health Army actually serving with the armed forces, the effort of every nurse and physician in the interest of public health is a direct contribution to the strength of America.

To you of the medical profession is entrusted the great responsibility of maintaining the nation's health in this emergency . . . and to the medical supply and equipment manufacturers, the task of maintaining the quality and quantity of essential pharmaceuticals, apparatus and supplies.

Mindful of its part in this responsibility, Patterson has taken steps to insure the availability of both fluoroscopic and intensifying screens. An ample supply of raw materials is in hand. Research and testing facilities have been expanded. More than adequate production is being maintained. The roentgenologist may rest assured that Patterson screens will continue to give that degree of extra performance that has made them the world's standard of quality.

PATTERSON'S facilities devoted 100% to Public Health and Defense of the Democracies

THE PATTERSON SCREEN CO. TOWANDA, PA., U. S. A.

Patterson X-Ray Screens

—Continued from page 17

plastics, and on investigations relating to the effects of high altitudes and crowded living conditions, as well as to the development of field instruments for the detection and measurement of toxic dusts, fumes, and gases. One of the most important problems under investigation is that of the toxicity of explosives. At present, the study is limited to determining the toxic effects of explosives administered by mouth. However, as soon as an experimental chamber now under construction has been completed, the scope of the study will be extended to include the determination of the toxic effects of vapors, fumes, dusts."

—J. LAWRENCE McLEOD, M.D., in *Minnesota Med.*, December, 1941.

Part Can Be Prevented

OUR urgent need to meet the requirements of the all-out defense program means that every man-day that can possibly be saved for production must be saved. We are sadly behind as it is because daily we are losing productive man-days through illness which could be prevented. If the cost of this profligate waste were only a matter of dollars and cents my concern would not be as great. Industry could assimilate that cost, but a nation cannot fight with a plane, tank, or gun which it does not have. There are 400,000,000 man-days lost to industry each year in this country. Only 10%, or 40,000,000 man-days, are due to industrial illness, leaving the appalling total of 360,000,000 man-days lost through non-industrial illness, part of which can be prevented. If the present rate of loss continues, it will be the equivalent of 1,000 factories each employing 1,000 workers shut down for the entire year. These are the factories which are now manufacturing the planes, guns, and tanks that we so sadly need. These must be kept in production through health care and medical services to the workers.

—From the chapter on "Health Service Centers in Defense Areas," by KINGSLEY ROBERTS, Director, Medical Administration Service, Washington, D. C., in *Proceedings of the National Conference of Social Work*, 1941, published by Columbia University Press.

Silicosis Claim Record

THE following is from the Seventh Annual Report of the Workman's Compensation Silicosis Fund of West Virginia, for the year ending June 30, 1941: "Eighty-five cases of silicosis or alleged silicosis have been reported to the department. In six of these, the employee did not file application for compensation. Fourteen claims were pending as of June 30, 1941. Of the remaining 65 cases, 32 were awarded and 33 denied by the Commissioner. This does not indicate that the Department is opposed to making awards in silicosis claims. The Silicosis Act provides "That compensation shall not be payable for the disease of silicosis, or death resulting therefrom, unless the employee has been exposed to the inhalation of silicon dioxide dust in harmful quantities over a period of not less than two years in the same employment in this state," and furthermore that claim for compensation must be made within one year from the last exposure to harmful quantities of silicon dioxide dust. Many employees do not comply with these provisions of the law, and are thus not entitled to benefits. Others do not know whether or not they are suffering from silicosis. They make claim, submit to thorough examinations, present their cases to the Commissioner for his findings, and thus obtain his decision. Quite a number have been found free from the disease, a discovery which is far more acceptable to all concerned than an award of compensation."

—Continued on page 100

MANUFACTURERS

Physicians as Inventors

CIBA SYMPOSIA for November, 1941, is given over to Technical Achievements of Physicians. The articles are interestingly written and fascinatingly illustrated. DRS. G. SCHAEFER and W. NAUMANN

write on "Physicians as Pioneers of Air Travel," "Physicians as Inventors of Steam Engines," "Medical Men as Investigators of Magnetism and Electricity," and "Physicians as Builders of Optical Instruments."

"Surgical Dressings"

JOHNSON & JOHNSON have just published an 80-page book entitled "Surgical Dressings." The text discusses the manufacture and uses of cotton, gauze, adhesive plaster and related products. An interesting chapter describes the central supply system for dressings, now being widely adopted in hospitals. There are many illustrations of processes and products. The purpose is to acquaint all in the healing arts with the types of dressings available for general use, and the economical management of supplies. "Surgical Dressings" will be sent, without charge, to physicians, surgeons, nurses, hospital personnel.

Economical Liver Therapy

AN INTERESTING report (*Am. J. M. Sc.*, 202:408, September, 1941) of a comparison between the therapeutic effectiveness of an extremely concentrated liver extract ('Reticulogen' — Parenteral Liver Extract with Vitamin B_1 Lilly) and less concentrated preparations shows a considerable saving to the physician and hospital using the former. Forty cases of pernicious anemia were treated, 35 for periods of from two to four years, and control cases were followed over the same period. Red blood-cell and hemoglobin levels were satisfactorily maintained, neural symptoms were controlled or actually improved, and the patients were able to combat successfully many types of acute and chronic disease almost as effectively as the average population. There was no evidence that this medication was lacking in any protective factor.

Iodocholeate

IODOCHOLEATE, which was the subject of the article on "Infections and Lesions in Minor Surgery—An Advancement in Iodine Therapy," by DR. I. ZWEIGEL, in INDUSTRIAL MEDICINE for December, 1941, may be obtained under the trade name "IODOLATE" (Iodocholeate) from the Iodocholeate Products Corporation, 760 Lake Street, Newark, New Jersey. DR. ZWEIGEL'S address is 22 Monticello Ave., Newark, New Jersey.

Windshield Decalcomania

VAN PATTEN PHARMACEUTICAL CO., Chicago, has a 3 in. x 4 in. decalcomania for use by physicians on automobile windshields. This is available to physicians, without cost, on request. Address Van Patten Pharmaceutical Co., 54 West Illinois Street, Chicago.

Amino Acids—Stearns

CULMINATING the research which has been under way for several years in the Biochemical Research Laboratories of Frederick Stearns & Company, Amino Acids-Stearns is now being introduced to the medical profession. Based upon the literature, the opinions of well-recognized authorities and the results of carefully controlled research, a product has been prepared that may be administered orally, subcutaneously, intramuscularly and intravenously. A method for chemical standardization has been developed whereby the physician and patient can be assured of a constant product. Each lot is proved safe for injection. The administration of Amino Acids is particularly advantageous when given pre-operatively and postoperatively because adequate protein protects the liver from hepatoxic effects of anesthetics and reduces the postoperative loss of nitrogen. It is also of value as a substitute for protein feeding in maintaining a positive nitrogen balance and in the correction of hypoproteinemias found in chronic illnesses such as nephritis, carcinoma, colitis, hyperthyroidism, hepatic insufficiencies, inanition, certain types of anemia.

Capsules Ferrous Sulfate with B_1

E. R. SQUIBB & SONS, New York, to supplement their line of products for use in the treatment of

In addition to its EFFECTIVENESS consider the CONVENIENCE and ECONOMY of

Amniotin

THE effectiveness of Amniotin in the treatment of menopausal symptoms has been abundantly demonstrated during the past twelve years. Amniotin has also proved effective in treating other conditions related to deficiency of estrogenic hormone, including senile vaginitis, kraurosis vulvae, pruritis vulvae and of gonorrheal vaginitis in children.

Now, by packaging Amniotin in 10-cc. and 20-cc. rubber-capped vials, the Squibb Laboratories have made the product far more economical to use without sacrifice of activity, uniformity or stability. By using these new "bulk packages" the physician can adjust the dosage to suit the wide variation in requirements of women with menopausal symptoms.

Amniotin differs from estrogenic substances containing or derived from a single crystalline factor in that it is a highly purified, non-crystalline preparation of naturally occurring estrogenic substances derived from pregnant mares' urine. Its estrogenic activity is expressed in terms of the equivalent of international units of estrone.

For literature write the Professional Service Dept., E. R. Squibb & Sons, 745 Fifth Avenue, New York

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4,000 I.U. per capsule—boxes of 20 and 100 caps.
10,000 I.U. per capsule—boxes of 20 and 100 caps.

Amniotin A SQUIBB PREPARATION OF ESTROGENIC SUBSTANCES OBTAINED FROM THE URINE OF PREGNANT MARES

anemia, have introduced Capsules Ferrous Sulfate with B_1. Each capsule contains 3 grains ferrous sulfate exsiccated (approximately 60 mg. iron) together with 1 mg. pure crystalline thiamine hydrochloride (333 U. S. P. XI units vitamin B_1). Capsules Ferrous Sulfate with B_1 Squibb are designed for oral administration in the prophylaxis and treatment of secondary anemia, especially where the addition of vitamin B_1 is considered desirable, as during pregnancy and lactation, infancy and childhood, and in patients with anorexia associated with thiamine lack. They may also be useful as a supplement to liver therapy in the treatment of pernicious anemia when an iron deficiency also exists.

Prize-Winner

VAN PATTEN PHARMACEUTICAL COMPANY, Chicago, about a year ago, announced awards to the amount of $1500 "for the best papers on vascular hypertension published in recognized American medical journals during the first six months of 1941." The prizes were to be awarded on the basis of votes by American physicians. During September, 1941, the company mailed every physician in America a ballot card. The balloting closed at midnight, September 30, the count was made by Certified Public Accountants of Chicago, and the prize-winning papers determined. The first prize of $1000 went to DRS. GOLDBLATT, WEINSTEIN and KAHN, of Cleveland, Ohio, for an article in *J. Exper. Med.*, March, 1941; the winners of the second and third prizes relinquished their awards, and the money in the amount of $350 was contributed to the American Red Cross; and the fourth prize of $50.00 was awarded to DR. M. H. BARKER, of Chicago, for his paper on "Hypertension: Significance and Treatment," in INDUSTRIAL MEDICINE for March, 1941.

New Bibliography

AN event of importance to those who are interested in and those who wish to get acquainted with the polarized dropping mercury electrode method of chemical analysis, is the recent publication of a comprehensive bibliography by Leeds & Northrup Company. This presents to English-speaking scientists a summarized record of achievement. It will doubtless be an aid to still greater stimulation of research in this important subject. First applied by Professor Heyrovsky, the use of the polarized dropping mercury electrode for qualitative and quantitative analysis of solutions has been widely extended. It is applicable to substances which ionize in solution and those which do not, both organic and inorganic. Comparable to the optical spectrographic method in both sensitivity and reproducibility, it is in many cases much faster. Substances may be identified by the polarizing potentials at which inflection points occur in the current potential curve and the quantity of each substance in the solution is indicated by the magnitude of the particular displacement. In compiling this 68-page bibliography, references in all languages were searched back to 1903. Foreign titles have been translated into English. There are nearly 800 references, which include direct and related subject matter relative to the theory and to specific applications. The book is divided into two sections. The first is a complete bibliography arranged both chronologically and alphabetically according to authors; the second is arranged by applications under 19 classifications. Anyone desiring a copy of this publication may have it free of charge by addressing Leeds & Northrup, 4934 Stenton Avenue, Philadelphia, Pa., asking for Bibliography E-94 (1), "Bibliography of the Polarized Dropping Mercury Electrode."

Disaster Package

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